



Department of Physics

Maulana Azad College

8, Rafi Ahmed Kidwai Road, Kolkata - 700013
 Email: physics@maulanaazadcollegekolkata.ac.in
 Website: <https://maulanaazadcollegekolkata.ac.in>

Syllabus: [View](#)

Curriculum / Lesson Plan : 2022-23

Undergraduate Honours / General Course (CBCS) under University of Calcutta

Semester, [Honours / General], [Period of Semester]	Course Code	Course Name	Brief Description of the Topics	Name of the Faculty	No. of Lectures
Sem - I Honours (July - December)	CC - 1	Mathematical Physics I (TH)	1. Calculus	Dr. Biswajit Maiti	20
			2. Vector Algebra and Vector Calculus	Dr. Biswajit Maiti	25
			3. Matrices	Dr. Abhishek Dey	15
	Mathematical Physics I (PR)	1. Introduction to plotting graphs with Gnuplot	Mrs. Indrani Roy	3 lectures + 6 classes	
		2. Introduction to programming in python	Mrs. Indrani Roy	16 lectures + 35 classes	
	CC - 2	Mechanics (TH)	1. Fundamentals of Dynamics	Mrs. Mina Mazumder	12
			2. Work and Energy		8
			3. Gravitation and Central Force Motion		10
		Mechanics (PR)	4. Non- Inertial Systems	Dr. Sanjay Chattopadhyay	12
			5. Rotational Dynamics		12
			6. Fluid Motion		6
	Total 6 experiments are to be performed			Dr. Sanjit K. Das, Dr. Sanjay Chattopadhyay	
Sem - I General (July - December)	GE - 1	Mechanics (TH)	1. Mathematical Methods	Mrs. Mina Mazumder	15
			2. Introduction to Newtonian Mechanics		5
			3. Rotational Motion		10
			4. Central Force and Gravitation		10
			5. Oscillations	Dr. Sanjay Chattopadhyay	9
			6. Elasticity		6
			7. Surface Tension		5
	Mechanics (PR)	Total 5 experiments are to be performed			



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Sem - II Honours (January - June)	CC - 3	Electricity and Magnetism (TH)	1. Dirac delta function and it's properties	Dr. Sanjay Chattopadhyay	3
			2. Electrostatics		12
			3. Dielectric properties of matter		6
			4. Method of images		4
			5. Electrostatic energy		3
			6. The magnetostatic field	10	
			7. Magnetic Properties of matter	7	
			8. Electr-magnetic induction	7	
			9. Electrical circuits	7	
		Electricity and Magnetism (PR)	Total 6 experiments are to be performed	Dr. Sanjit K. Das, Dr. Abhishek Dey	
	CC - 4	Waves and Optics (TH)	1. Oscillations	Dr. Pijush Kanti Ghosh	8
			2. Superposition of Harmonic Oscillations		4
			3. Wave Motion		4
			4. Superposition of Harmonic Waves		9
5. Wave optics			Mrs. Mina Mazumder	4	
6. Interference				10	
7. Interferometers				5	
8. Diffraction				16	
	Waves and Optics (PR)	Total 6 experiments are to be performed	Dr. Biswajit Maiti, Dr. Pijush Kanti Ghosh		
Sem - II General (January - June)	GE - 2	Electricity and Magnetism (TH)	1. Essential Vector Analysis	Dr. Sanjay Chattopadhyay	
			2. Electrostatics		
			3. Magnetism	Dr. Sanjit K Das	
			4. Electromagnetic Induction		
			5. Electrodynamics		
		Electricity and Magnetism (PR)	Total 5 experiments are to be performed	Dr. Pijush Kanti Ghosh and Mrs. Indrani Roy	



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Sem-III Honours (July - December)	CC-5	Mathematical Physics II (TH)	1. Fourier Series	Mrs. Mina Mazumder	10	
			2. Frobenius Method and Special Functions		20	
			3. Some Special Integrals	Dr. Biswajit Maiti	4	
			4. Integrals Transforms	Mrs. Mina Mazumder	10	
			5. Introduction to Probability	Dr. Biswajit Maiti	6	
			6. Partial Differential Equations		10	
		Mathematical Physics II (PR)	Dr. Sanjit K. Das	1. Introduction to Numpy and Scipy	15 lectures + 35 Classes 3 lectures + 7 classes	
				2. Introduction to Matplotlib		
		CC-6	Thermal Physics (TH)	1. Introduction to Thermodynamics	Dr. Pijush Kanti Ghosh	25
				2. Thermodynamic potentials	Dr. Sanjay Chattopadhyay	15
	3. Kinetic Theory of Gases			15		
	4. Conduction of Heat			5		
	Thermal Physics (P)		Total 5 experiments are to be performed		Mrs. Mina Mazumder and Mrs. Indrani Roy	
	CC-7	Modern Physics (TH)	1. Radiation and its nature	Dr. Sanjit k. Das	15	
			2. Basics of Quantum Mechanics		15	
			3. Nuclear Structure	Dr. Pijush Kanti Ghosh	10	
			4. Interaction with and within nucleus		12	
			5. Lasers	Mrs. Mina Mazumder	8	
		Modern Physics (PR)	Total 5 experiments are to be performed		Dr. Sanjit K. Das, Dr. Biswajit Maiti	
		SEC A-1	Scientific Writing (Project Type)	1. Introduction to LATEX	Dr. Abhishek Dey	2
	2. Document classes			1		
	3. Page Layout			2		
	4. List structures			1		
5. Representation of Mathematical equations	5					
6. Customization of fonts	1					
7. Writing tables	2					
8. Figures	1					



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Sem-III General (July - December)	GE-3	Thermal Physics and Statistical Mechanics (TH)	1. Laws of Thermodynamics	Mrs. Indrani Roy	18
			2. Thermodynamical potentials		9
			3. Kinetic Theory of Gases	Dr. Pijush Kanti Ghosh	10
			4. Theory of Radiation		8
			5. Statistical Mechanics		15
Thermal Physics and Statistical Mechanics (PR)	Total 5 experiments are to be performed	Dr. Pijush Kanti Ghosh and Mrs. Indrani Roy			
Sem-IV Honours (January - June)	CC-8	Mathematical Physics III (TH)	1. Complex Analysis	Dr. Pijush Kanti Ghosh	20
			2. Variational Calculus in Physics	Dr. Abhishek Dey	20
			3. Special Theory of Relativity		20
		Mathematical Physics III (PR)	1. Exploring Gaussian Integrals and the delta function	Dr. Sanjit K. Das	3 lectures + 8 classes
			2. Solution of differential equation		3 lectures + 6 classes
			3. Special functions		3 lectures + 6 classes
			4. Solution of some basic PDEs		5 lectures + 20 classes
			5. Fourier Series		2 lectures + 4 classes
		CC-9	Analog Systems and Applications (TH)	1. Circuits and Network	Dr. Sanjay Chattopadhyay
	2. Semiconductor Diodes and application			8	
	3. Bipolar Junction transistors and biasing			Mrs. Mina Mazumder	10
	4. Field effect transistors			Dr. Sanjay Chattopadhyay	5
	5. Regulated power supply			Mrs. Mina Mazumder	3
	6. Amplifiers				5
	7. Feedback amplifiers and OPAMP			15	
8. Multivibrator	Dr. Sanjay Chattopadhyay			5	
9. Oscillators	Mrs. Mina Mazumder			5	
Analog Systems and Applications (PR)	Total 6 experiments are to be performed				



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	CC-10	Quantum Mechanics (TH)	1. Wavepacket description	Mrs. Indrani Roy	5
			2. General discussion of bound states in an arbitrary potential		8
			3. Quantum mechanics of simple harmonic oscillator		6
			4. Quantum theory of hydrogen-like atoms	Dr. Abhishek Dey	8
			5. Generalized Angular Momenta and Spin		10
			6. Spectra of Hydrogen atom and its fine structure		5
			7. Atoms in Electric & Magnetic Fields		8
			8. Many electron atoms		10
	Quantum Mechanics (PR)	1. Finding eigenstates solving transcendental equation	Dr. Abhishek Dey	3 lectures + 6 classes	
		2. Use of shooting algorithm		7 lectures + 20 classes	
		3. Time evaluation of wave packet		6 lectures + 18 classes	
	SEC B-2	Electrical Circuits and Network skills (Theory)	1. Dc generator	Dr. Sanjay Chattopadhyay	10
			2. Transformer		5
			3. Ac motor		6
4. Measurements and faults			9		
Sem-IV Honours (January - June)	GE 4	Waves and Optics (TH)	1. Acoustics	Mrs. Indrani Roy	10
			2. Superposition of Vibrations		5
			3. Vibrations in String		8
			4. Introduction to Wave optics	Mrs. Mina Mazumder	2
			5. Interference		15
			6. Diffraction		10
			7. Polarization		10
	Wave and Optics (PR)		Mrs. Indrani Roy, Dr. Biswajit Maiti		



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Sem-V Honours (July - December)	CC-11	Electromagnetic Theory (TH)	1. Maxwell's Equations	Dr. Sanjit K. Das	12		
			2. EM Wave Propagation in Unbounded Media		10		
			3. EM Wave in Bounded Media		10		
			4. Polarization	Dr. Pijush Kanti Ghosh	7		
			5. Polarization in Uniaxial crystals		15		
			6. Rotatory polarization		6		
		Electromagnetic Theory (PR)	Total 5 experiments are to be performed	Dr. Biswajit Maiti, Dr. Pijush Kanti Ghosh			
	CC-12	Statistical Physics (TH)		1. Classical Statistical Mechanics	Dr. Pijush Kanti Ghosh	25	
				2. Systems of Identical particles	Dr. Biswajit Maiti	6	
				3. Bose-Einstein Statistics		12	
				4. Radiation: classical and quantum aspects	Dr. Pijush Kanti Ghosh	7	
				5. Fermi-Dirac Statistics	Dr. Biswajit Maiti	10	
		Statistical Physics (PR)			1. Study of Random Numbers and Time Series	Dr. Abhishek Dey	5 lectures + 15 classes
					2. Applications of Random Numbers		8 lectures + 20 classes
					3. Scaling and plots, exponents and parameters		4 lectures + 8 classes
		DSE A1 (b)	Laser and Fibre Optics (TH)		1. Einstein coefficients and Rate equations	Mrs. Mina Mazumder	20 Lectures
					2. Basic properties of laser	Dr. Sanjay Chattopadhyay	4 Lectures
	3. Resonators				8 Lectures		
	4. Transient effect				5 Lectures		
	5. Basic Laser Systems				7 Lectures		
	6. Practical properties and uses of laser					5 Lectures	
	7. Fiber optics				Mrs. Mina Mazumder	12 Lectures	
	8. Holography					4 Lectures	
9. Introductory Nonlinear Optics	10 Lectures						
DSE B1 (a)	Astronomy and Astrophysics (TH)		1. Tools of Astronomy	Dr. Abhishek Dey	15 Lectures		
			2. Stars and stellar systems		25 Lectures		
			3. Galaxies and the Universe		10 Lectures		
			4. Cosmology		25 Lectures		



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Sem-VI Honours (January - June)	CC-13	Digital Electronics (TH)	1. Integrated Circuits	Dr. Abhishek Dey	5 Lectures
			2. Number System		7 Lectures
			3. Digital Circuits		16 Lectures
			4. Implementation of different circ		6 Lectures
			5. Data processing circuits	Mrs. Mina Mazumder	5 Lectures
			6. Sequential Circuits:		6 Lectures
			7. Registers and Counters		6 Lectures
			8. Computer Organization		6 Lectures
			9. Data Conversion		3 Lectures
	Digital Electronics (PR)	Total 5 experiments are to be performed	Dr. Sanjay Chattopadhyay, Mrs. Mina Mazumder		
	CC-14	Solid State Physics (TH)	1. Crystal Structure	Dr. Pijush Kanti Ghosh	12 Lectures
			2. Elementary Lattice Dynamics		10 Lectures
			3. Magnetic Properties of Matter		8 Lectures
			4. Dielectric Properties of Materials		8 Lectures
			5. Drude's theory	Dr. Sanjit K. Das	4 Lectures
			6. Elementary band theory		12 Lectures
			7. Superconductivity		6 Lectures
	Solid State Physics (PR)	Total 5 experiments are to be performed	Dr. Biswajit Maiti, Dr. Pijush Kanti Ghosh		
	DSE A2 (a)	Nano Materials and Applications (TH)	1. Nanoscale Systems	Dr. Biswajit Maiti	10 Lectures
			2. Synthesis of Nanostructure Materials		15 Lectures
3. Characterization			10 Lectures		
4. Optical Properties			15 Lectures		
5. Electron Transport			10 Lectures		
6. Applications			15 Lectures		
DSE B2 (a)	Communication Electronics (TH)	1. Electronic communication	Mrs. Mina Mazumder	10 Lectures	
		2. Analog Modulation		15 Lectures	
		3. Analog Pulse Modulation		10 Lectures	
		4. Digital Pulse Modulation	Dr. Sanjay Chattopadhyay	15 Lectures	
		5. Introduction to Communication and Navigation systems:		25 Lectures	

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