DEPARTMENT OF PHYSICS
Teaching Plan
Session: 2022-2023 (September–December)

Name of the teacher: Himanshu Bora
Programme Name: B.Sc. Physics (CBCS)

Semester: 1st Semester (CBCS)
Paper Name and Code:
1. Mathematical Physics I (PHY-HC-1016)
2. Mechanics (PHY-HC-1026)
3. Mechanics (PHY-HG/RC-1016)

1. Mathematical Physics I (PHY-HC-1016)

Week / Month	Unit / Topic	No. of Classes	Learning Resources & Teaching Methods	Evaluating Modes
September 2022	**Unit II: First and Second order Differential Equations** • First Order and Second Order Differential equations: First Order Differential Equations and Integrating Factor. Homogeneous Equations with constant coefficients. Wronskian and general solution. • Calculus of functions of more than one variable: Partial derivatives, exact and inexact differentials. Integrating factor, with simple illustration.	7	**Learning Materials:** • Recommended Textbooks • Lecture Notes • Video Lectures **Teaching Methods:** • Chalk and Talk • Digital Demonstrations • Problem Solving Methodologies	• Class Test • Assignment
October 2022	**Unit IV: Dirac Delta function and its Properties** • Definition of Dirac delta function. • Representation as limit of a Gaussian function and rectangular function. • Properties of Dirac delta function. **Unit V: Introduction to Probability** • Independent random variables: Probability distribution functions; binomial, Gaussian and Poisson, with examples. • Mean and variance.	2	**Learning Materials:** • Recommended Textbooks • Lecture Notes **Teaching Methods:** • Chalk and Talk • Problem Solving Methodologies	• Class Test • Assignment

Week / Month	Unit / Topic	No. of Classes	Learning Resources & Teaching Methods	Evaluating Modes
November 2022	**Unit VI: Theory of Errors** • Systematic and Random Errors. • Propagation of Errors. • Normal Law of Errors. • Standard and Probable Error. • Least-squares fit.	4	**Learning Materials:** • Recommended Textbooks • Lecture Notes **Teaching Methods:** • Chalk and Talk • Problem Solving Methodologies	• Class Test
	Laboratory: Computational Physics	8	**Learning Materials:** • Recommended Textbooks • Lecture Notes • Video Lectures • PPT **Teaching Methods:** • Digital Demonstrations • Problem Solving Methodologies	• Assignment
December 2022	**End Semester Examination**			

2. Mechanics (PHY-HC-1026)

Week / Month	Unit / Topic	No. of Classes	Learning Resources & Teaching Methods	Evaluating Modes
September 2022	**Unit VII: Gravitation and Central Force Motion** • Law of gravitation. Gravitational potential energy. Inertial and gravitational mass. • Potential and field due to spherical shell and solid sphere.	4	**Learning Materials:** • Recommended Textbooks • Lecture Notes **Teaching Methods:** • Chalk and Talk • Classroom Discussion • Problem Solving Methodologies	• Class Test
October 2022	**Unit VII: Gravitation and Central Force Motion** • Motion of a particle under a central force field. Two-body problem and its reduction to one-body problem and its solution. The energy equation and energy diagram. • Kepler's Laws.	4	**Learning Materials:** • Recommended Textbooks • Lecture Notes **Teaching Methods:** • Chalk and Talk • Classroom Discussion • Problem Solving Methodologies	• Class Test • Assignment

Week / Month	Unit / Topic	No. of Classes	Learning Resources & Teaching Methods	Evaluating Modes
November 2022	**Unit X: Special Theory of Relativity** • Michelson-Morley Experiment and its outcome. • Postulates of Special Theory of Relativity. • Lorentz Transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. • Variation of mass with velocity. Massless Particles. Mass-energy Equivalence. • Relativistic Doppler effect. • Relativistic Kinematics. Transformation of Energy and Momentum.	4	**Learning Materials:** • Recommended Textbooks • Lecture Notes **Teaching Methods:** • Chalk and Talk • Classroom Discussion • Problem Solving Methodologies	• Class Test • Assignment
December 2022	**End Semester Examination**			

3. Mechanics (PHY-HG/RC-1016)

Week / Month	Unit / Topic	No. of Classes	Learning Resources & Teaching Methods	Evaluating Modes
November 2022	**Unit VII : Special Theory of Relativity** • Constancy of speed of light. • Postulates of Special Theory of Relativity. • Length contraction. Time dilation. • Relativistic addition of velocities.	6	**Learning Materials:** • Recommended Textbooks • Lecture Notes • Video Lectures **Teaching Methods:** • Chalk and Talk • Classroom Discussion • Problem Solving Methodologies	• Class Test • Assignment
December 2022	**End Semester Examination**			