

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**COURSE PLAN****June - November 2024**

Department : Physics
Name/s of the Faculty : Dr.Asisi Janifer. M
Course Title : PHYSICS FOR MATHEMATICS I
Course Code : 23PH/AC/PM13
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	Acquire knowledge on elasticity, bending of beams, fundamental principles and theories of surface tension and viscosity of liquids, mechanics, and the basic concepts of relativity.	K1
CO2	Describe the elastic behaviour of solids, the physical properties of liquids that impact fluid motion, and explain the concepts of mechanics and relativity.	K2
CO3	Apply the theoretical concepts to determine bending moment, elevation and depression in a beam due to different types of loading, to illustrate elastic collision of particles, oscillation in spring mass, constraints, Lagrangian equation and paradox in relativity.	K3
CO4	Deduce expressions related to elasticity of solids, fluid dynamics, mechanics and relativity.	K4
CO5	Evaluate problems related to properties of solids and fluids, centre of mass, elastic collision of particles, simple harmonic motion, Lagrangian equation and transformation equations.	K5

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 24 – 26, 2024 (Day Order 4 - 6)	I	Mechanics I 1.1 Impulse-Impact-Conservation of linear momentum: Internal forces and momentum conservation – center of mass- examples	K1-K5	2	CO1-CO5	Seminar and power point presentation	Discussion and questioning
Jun 27 – July 4, 2024 (Day Order 1 - 6)	I	General elastic collision of particles of different masses. 1.2 Significance of conservation laws- law of conservation of Energy- concepts of work- power – energy – potential energy.	K1-K5	3	CO1-CO5	Seminar and power point presentation	Discussion and questioning
July 5 – 12, 2024 (Day Order 1 - 6)	II	Mechanics II 2.1 Simple Harmonic Motion: Periodic and Harmonic Motion- Formula for acceleration, velocity and displacement - Energy of a Harmonic Oscillator	K1-K5	3	CO1-CO5	Seminar and video session	Discussion and questioning
July 15 – 23, 2024 (Day Order 1 - 6)	II	oscillation in spring mass-springs in series and parallel. 2.2 Classical mechanics: Degrees of freedom and constraints Generalized Coordinates	K1-K5	3	CO1-CO5	Seminar and power point presentation	Discussion and questioning
July 24 – 31, 2024 (Day Order 1 - 6)	II	principle of virtual work - De Alembert's principle -Explanation of Lagrangian equation (No derivation)	K1-K5	3	CO1-CO5	Seminar and power point presentation	Third component

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Aug 1 – 5, 2024 (Day Order 1 - 3)	II	Application of Lagrangian equation in Atwood's machine and Simple pendulum.	K1-K5	3	CO1-CO5	Seminar and power point presentation	Discussion and questioning
Aug 6 – 10, 2024	C.A. Test - I						
Aug 12 – 14, 2024 (Day Order 4-6)	III	Elasticity 3.1 Elastic properties: Hooke's law - Elastic limit moduli of Elasticity Poisson's ratio 3.2 Expression for Bending Moment -	K1-K5	2	CO1-CO5	Seminar and power point presentation	Discussion and questioning
Aug 16 – 23, 2024 (Day Order 1-6)	III	Depression at the loaded end of the cantilever – depression and elevation at the midpoint of a loaded beam (non-uniform and uniform bending)	K1-K5	2	CO1-CO5	Seminar and power point presentation	Discussion and questioning
Aug 27 – Sep 3, 2024 (Day Order 1-6)	III, IV	Torsion in a wire – Torque per unit twist – torsional oscillations – Expression for period Viscosity and Surface Tension 4.1 Coefficient of viscosity	K1-K5	2	CO1-CO5	Lecture and demonstration session	Discussion and questioning
Sep 4 – 11, 2024 (Day Order 1-6)	IV	Stream Line Flow and Turbulent Flow Velocity – Euler's Equation for unidirectional flow	K1-K5	2	CO1-CO5	Seminar and power point presentation	Third component

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Sep 12 - 20, 2024 (Day Order 1-6)	IV	4.2 Surface Tension: molecular theory of surface tension Determination of Surface Tension by Drop Weight Method- Interfacial Surface Tension	K1-K5	2	CO1- CO5	Seminar and power point presentation	Discussion and questioning
Sep 23 - 26, 2024(Day Order 1-4)	V	Relativity 5.1 Inertial Frames of Reference	K1-K5	1	CO1- CO5	Seminar and power point presentation	Discussion and questioning
Sep 27 – Oct 3, 2024	C.A. Test - II						
Oct 4 – 5, 2024 (Day 5 & 6)	V	Newtonian Relativity – Galilean Transformation Equations Postulates of Special Theory of Relativity-	K1-K5	1	CO1- CO5	Black board ,PPT	Discussion and questioning
Oct 7 - 15, 2024(Day Order 1 to 6)	V	Lorentz Transformation Equations- Length Contraction Time Dilation - Twin Paradox and Meson Paradox	K1-K5	2	CO1- CO5	Lecture and demonstration video	Discussion and questioning
Oct 16 - 22, 2024(Day Order 1 to 6)	V	5.3 Relativistic Momentum (no derivation) – Mass Energy Relation- Physical Significance.	K1-K5	1	CO1- CO5	Black board ,PPT	Discussion and questioning

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Oct 23 - 24, 2024(Day Order 1 to 2)		REVISION					