

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

**Department** : PHYSICS  
**Name/s of the Faculty** : SR. JOSEPHINE DIANA  
**Course Title** : PHYSICS FOR MATHEMATICS - I  
**Course Code** : 23PH/AC/PM13  
**Shift** : I

**COURSE OUTCOMES (COs)**

<b>COs</b>	<b>Description</b>	<b>CL</b>
<b>CO1</b>	Acquire knowledge on elasticity, bending of beams and theories of surface tension and viscosity of liquids, mechanics, and the basic concepts of relativity.	<b>K1</b>
<b>CO2</b>	Describe the elastic behaviour of solids, the physical properties of liquids that impact fluid motion, and explain the concepts of mechanics and relativity.	<b>K2</b>
<b>CO3</b>	Apply the mathematical tools to solve simple and complex problems in physics	<b>K3</b>
<b>CO4</b>	Examine the behaviour of rigid bodies and liquids utilizing theoretical concepts.	<b>K4</b>
<b>CO5</b>	Formulate the knowledge gained in theory for real life and practical applications.	<b>K5</b>

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 24 – 26, 2024 (Day Order 4 - 6)	1	Introduction to Mechanics	K1	1	1	Lecture,	
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	<b>Mechanics I</b> <b>1.1</b> Impulse-Impact-Conservation of linear momentum: Internal forces and momentum conservation – center of mass- examples	K1-K5	2	CO1-CO5	Lecture, Powerpoint Presentation, Demonstration	Questioning on the classes taught
July 5 – 12, 2024 (Day Order 1 - 6)	1	General elastic collision of particles of different masses. <b>1.2</b> Significance of conservation laws- law of conservation of Energy- concepts of work- power – energy – potential energy.	K1-K5	3	CO1-CO5	Lecture, Powerpoint Presentation, Demonstration, Problem solving	
July 15 – 23, 2024 (Day Order 1 - 6)	2	<b>Mechanics II</b> <b>2.1</b> Simple Harmonic Motion: Periodic and Harmonic Motion- Formula for acceleration, velocity and displacement - Energy of a Harmonic Oscillator	K1-K5	3	CO1-CO5	Lecture, Powerpoint Presentation, Demonstration, problem solving	Questioning on the classes taught

July 24 – 31, 2024 (Day Order 1 - 6)	2	oscillation in spring mass-springs in series and parallel. <b>2.2</b> Classical mechanics: Degrees of freedom and constraints Generalized Coordinates	K1-K5	3	CO1-CO5	Lecture, Powerpoint Presentation, Demonstration, problem solving	Component Test-K3, K4 Assessment
Aug 1 – 5, 2024 (Day Order 1 - 3)	2	principle of virtual work - De Alembert's principle - Explanation of Lagrangian equation (No derivation) Application of Lagrangian equation in Atwood's machine and Simple pendulum.	K1-K5	2	CO1-CO5	Lecture, Powerpoint Presentation, problem solving	
Aug 6 – 10, 2024	<b>C.A. Test - I</b>						
Aug 12 – 14, 2024 (Day Order 4-6)	3	<b>Elasticity</b> <b>3.1</b> Elastic properties: Hooke's law - Elastic limit moduli of Elasticity Poisson's ratio <b>3.2</b> Expression for Bending Moment -	K1-K5	2	CO1-CO5	Lecture, Powerpoint Presentation, Demonstration, problem solving	quiz
Aug 16 – 23, 2024 (Day Order 1-6)	3	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	3	CO1-CO5	Lecture, Powerpoint Presentation, Demonstration, problem solving	

Aug 27 – Sep 3, 2024 (Day Order 1-6)	3	Torsion in a wire – Torque per unit twist – torsional oscillations – Expression for period <b>Viscosity and Surface Tension</b> <b>4.1</b> Coefficient of viscosity	K1-K5	3	CO1- CO5	Lecture, Powerpoint Presentation, Demonstration, problem solving	Assignment- K6 assessment
Sep 4 – 11, 2024 (Day Order 1-6)	4	Stream Line Flow and Turbulent Flow Velocity – Euler’s Equation for unidirectional flow	K1-K5	3	CO1- CO5	Lecture, Powerpoint Presentation, Demonstration, problem solving	
Sep 12 - 20, 2024 (Day Order 1-6)	4	<b>4.2</b> Surface Tension: molecular theory of surface tension Determination of Surface Tension by Drop Weight Method- Interfacial Surface Tension	K1-K5	3	CO1- CO5	Lecture, Powerpoint Presentation, Demonstration, problem solving	Problem Test – K 5 assessment
Sep 23 - 26, 2024 (Day Order 1-4)	5	<b>Relativity</b> <b>5.1</b> Inertial Frames of Reference- Newtonian Relativity – Galilean Transformation Equations	K1-K5	2	CO1- CO5	Lecture, Powerpoint Presentation, Demonstration Video, problem solving	
Sep 27 – Oct 3, 2024	<b>C.A. Test - II</b>						
Oct 4 – 5, 2024 (Day 5 & 6)	5	5.1 Postulates of Special Theory of Relativity-	K1-K5	1	CO1- CO5	Lecture, Powerpoint presentation	

Oct 7 - 15, 2024 (Day Order 1 to 6)	5	5.1 Lorentz Transformation Equations- Length Contraction Time Dilation - Twin Paradox and Meson Paradox	K1-K5	3	CO1-CO5	Lecture, Powerpoint Presentation, Demonstration, problem solving	Short test
Oct 16 - 22, 2024 (Day Order 1 to 6)	5	5.3 Relativistic Momentum (no derivation) – Mass Energy Relation- Physical Significance.	K1-K5	3	CO1-CO5	Lecture and Powerpoint presentation, problem solving	
Oct 23 - 24, 2024 (Day Order 1 to 2)	<b>REVISION</b>						