

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI
COURSE PLAN (June - November 2026)

Department : Physics
Name/s of the Faculty : Ms. Christy Preetha. A
Course Title : Mechanics
Course Code : 25PH/MC/ME34
Shift : I

COURSE OUTCOMES (COs)

COs	Description						CL
CO1	define the fundamental physical laws governing motion, gravitation, momentum, energy, rigid body dynamics, and Lagrangian mechanics						K1
CO2	explain the Newtonian laws of motion, various theories of gravitation, conservation laws of momentum and energy, types of motion and the concepts of Lagrangian Mechanics.						K2
CO3	explain the dynamics of physical systems such as planetary motion, colliding particles, rotating bodies and Lagrangian equation of motion						K3
CO4	deduce expressions on Newton's law of gravitation, Kepler's laws, conservation laws of linear and angular momentum, energy and systems with variable mass.						K4
CO5	apply principles of mechanics to solve problems involving translational and rotational motion, gravitational potential, and Lagrangian formulations such as the Atwood's machine and simple pendulum.						K5
Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 15 – 22, 2026 (Day Order 1- 6)	1	1.1 Laws of motion: Newton's Law of motion– Forces – Types of forces – Types of	K1-K5	4	1-5	Interactive lecture and simulations	MCQ quizzes

		everyday forces in Physics - Frame of reference					
Jun 23 – July 1, 2026 (Day Order 1- 6)	1	1.1 Dynamics of a particle-charged particle 1.2 Gravitation: Basic forces of Nature– Newton’s law of gravitation – Determination of G by Boy’s method - Density of earth – Mass of the earth and the Sun	K1-K5	4	1-5	Lecture, simulations	Concept mapping
July 2 – July 8, 2026 (Day Order 1- 6)	1	1.2 Law of Gravitation and Theory of relativity- Gravitational field- intensity of the field- gravitational potential and gravitational potential energy– Kepler’s laws- Newtons law of gravitation from Kepler’s law.	K1-K5	4	1-5	Lecture, simulations	Simulation report
July 9 – 16, 2026 (Day Order 1- 6)	2	2.1 Conservation of linear momentum – Centre of mass – Motion of velocity of centre of mass-linear momentum about centre of mass – system of two particles.	K1-K5	4	1-5	Lecture, problem-solving	Third component I: Problem-solving test (K3 level for 15 marks)

		2.2 Collision- General elastic collision of particles of different masses – System with variable mass – Rocket.					
July 17 – 24, 2026 (Day Order 1- 6)	2 & 3	2.3 Angular momentum – Torque due to internal forces – Conservation of angular momentum- illustrative examples of angular momentum. 3.1 Introduction - Significance of conservation laws - Law of conservation of energy	K1-K5	4	1-5	Lecture	Third component I: Problem-solving test (K3 level for 15 marks)
July 25 – 28, 2026 (Day Order 1- 3)	3	3.1 concepts of work - Power – Energy	K1-K5	2	1-5	Lecture	Numerical quiz
July 29 – Aug 3, 2026	C.A. Test - I						
Aug 4 - 6, 2026 (Day Order 4 - 6)	3	3.2 Conservative forces – conservative force as negative gradient of potential energy - Law of conservation of mechanical energy	K1-K5	2	1-5	Lecture	Concept mapping
Aug 7 – 14, 2026 (Day Order 1- 6)	3&4	3.2 Potential energy in an electric field - electric potential.	K1-K5	4	1-5	Lecture	Concept mapping

		3.3 non-conservative forces – General law of conservation of Energy. 4.1 Translational and Rotational motion - Moment of inertia					
Aug 17 - 24, 2026 (Day Order 1- 6)	4	4.1 Angular momentum of a rotating body – General theorems of moment of inertia - Kinetic energy body of rotation	K1-K5	4	1-5	Lecture	Case-study worksheet
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	4	4.1 Body rolling along a plane surface – Body rolling down an inclined plane.	K1-K5	4	1-5	Lecture, problem-solving	Third component II: Descriptive test (K1, K2 levels for 20 marks)
Sep 3 – 11, 2026 (Day Order 1- 6)	4	4.2 Rotation about fixed axis – The Compound pendulum – Centre of suspension and centre of oscillation – The Bifilar Pendulum- parallel – non parallel threads.	K1-K5	4	1-5	Lecture with demonstration	Third component II: Descriptive test (K1, K2 levels for 20 marks)
Sep 15-17, 2026 (Day Order 1 - 3)	4	4.3 Gyroscopic Precision	K1-K5	2	1-5	Lecture	Concept mapping

Sep 18 –23, 2026	C.A. Test - II						
Sep 24 - 28, 2026 (Day 4 – 6)	4	4.3 Gyrostatic applications.	K1-K5	2	1-5	Lecture	Discussion of real-world examples
Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	5	5.1 Generalized coordinates - Degrees of Freedom – Constraints. 5.2 Principle of Virtual Work and D’ Alembert’s Principle.	K1-K5	4	1-5	Lecture	Third component III: Applied Mechanics project on any concept from units 1-5 (K5 level for 15 marks)
Oct 8 - 14, 2026 (Day Order 1 - 6)	5	5.3 Lagrange’s Equation From D’ Alembert’s Principle- Application- Simple Pendulum – Atwood’s Machine	K1-K5	4	1-5	Lecture with problem-solving	Problem-solving on real world examples
Oct 15 - 21, 2026 (Day Order 1- 4)	REVISION						