

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**COURSE PLAN (November 2024 – April 2025)**

Department : Mathematics
Name/s of the Faculty : Dr. P. Subbulakshmi
Course Title : Elements of Space Science
Course Code : 23MT/ME/ES45
Shift : II

COURSE OUTCOMES (COs)

COs	Description 4	CL
CO1	explain fundamental ideas in the field of astronomy	K1
CO2	acquire the knowledge of the concepts governed by mathematics to the universe	K2
CO3	showcase the principles governing the movement of celestial objects	K3
CO4	analyze and spot the celestial bodies in the sky by naked eye / binoculars / telescopes	K4
CO5	visualize the real time application of mathematics in space science	K5

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Nov 18 – 25, 2024 (Day Order 1-6) (5 hours)	1	Spherical Trigonometry 1.1 Spherical Trigonometry 1.2 Spherical Triangle- Polar Triangle - Definition 1.3 Some Properties of Spherical Triangles	K1-K5	5	CO1-5	Lecturing Flipped Classroom	Questioning

Nov 26- Dec 3, 2024 (Day Order 1 to 6) (5 hours)	1	Spherical Trigonometry 1.4 Relations Between the Sides and Angles of a Spherical Triangle- Cosine, Sine, Cotangent Formula, Supplemental Cosine Formula, Five Parts Formula, Napier's Formula (Statements Only) 1.5 Napier's Analogies and Napier's Rules 1.6 Simple Problems Based on the Concepts Only	K1-K5	5	CO1-5	Lecturing Flipped Classroom Problem Solving	Slip Test
Dec 4-11, 2024 (Day Order 1 to 6) (5 hours)	2	Celestial Sphere, Diurnal Motion 2.1 Celestial Sphere, Diurnal Motion- Celestial Axis, Celestial Equator – Celestial Horizon, Celestial Meridian 2.2 Cardinal Points - Declination Circles – Verticals – Parallaxic Angle 2.3 Annual Motion of the Sun – First Point of Aries and First Point of Libra – Equinoxes and Solstices – Colures 2.4 Celestial Co-ordinates 2.5 To Represent the Different System of Coordinates in the Same Figure	K1-K5	5	CO1-5	Lecturing	MCQ Test [15 marks] (Unit1 – Sections 1.1 to 1.3)
Dec 12-19, 2024 (Day Order 1 to 6) (5 hours)	2	Celestial Sphere, Diurnal Motion 2.6 To Find the Relation between Right Ascension and Longitude of the Sun 2.7 To Find the Longitude of Sun on Any Day 2.8 Latitude of a Place 2.9 To Find the Right Ascension and Declination of a Body	K1-K5	5	CO1-5	Lecturing Problem Solving	Slip Test
Dec 20, 2024 (Day Order 1)	2	Celestial Sphere, Diurnal Motion 2.10 To Find the Hour Angle of a Body at Rising Or Setting – Duration of Day Time	K1-K5	1	CO1-5	Lecturing	Questioning

(1 hour)							
Jan 3 – 7, 2025 (Day Order 3 to 6) (3 hours)	2 3	2.11 Morning and Evening Stars – Circumpolar Stars- Condition for Circumpolar Star The Earth 3.1 Zones of Earth 3.2 Variations in Duration of Day and Night	K1-K5	3	CO1-5	Lecturing Flipped Classroom	Slip Test
Jan 8 – 17, 2024 (Day Order 1 to 6) (5 hours)	3	The Earth 3.3 Duration and Condition for Perpetual Day and Perpetual Night 3.4 Simple Problems Based on Above Concepts Only 3.5 Terrestrial Latitudes and Longitudes 3.6 Phenomena on Change of Latitudes and Longitudes 3.7 Date Line – Shape of Earth	K1-K5	5	CO1-5	Lecturing Problem Solving	Questioning
Jan 18 - 23, 2025	C.A. Test – I [Unit 1 – Sections 1.4 to 1.6, Unit 2]						
Jan 24 -31, 2025 (Day Order 1 to 6) (5 hours)	3	The Earth 3.8 Reduction of Latitude 3.9 Dip of Horizon – Expression and Effects of Dip 3.10 Twilight - Duration of Twilight – Civil, Nautical and Astronomical Twilights Planetary Phenomena 3.11 Elongation of a Planet	K1-K5	5	CO1-5	Lecturing Presentations	Questioning
Feb 3-8, 2025 (Day Order 1 to 6) (5 hours)	3 4	3.12 Direct and Retrograde Motions of Planets 3.13 To Find Positions of two Planets when they are Stationary as Seen from each other Kepler’s Laws	K1-K5	5	CO1-5	Lecturing Presentations	Project [15 marks] (Unit 4 – Sections 4.1

		4.1 Kepler's Laws of Planetary Motion 4.2 To Calculate the Eccentricity of the Earth's Orbit around the Sun 4.3 Newton's Deduction from Kepler's Laws - Kepler's Third Law from Newtons Law of Gravitation					to 4.3)
Feb 10– 18, 2025 (Day Order 1 to 4) (3 hours)	4	Kepler's Laws 4.4 To Find the Mass of a Planet The Moon 4.5 Relation Between Sidereal and Synodic Months 4.6 Phases of Moon	K1-K5	3	CO1-5	Lecturing Flipped Classroom	Questioning
Feb 19- 26, 2025 (Day Order 1-6) (5 hours)	4	The Moon 4.7 Position of Moon at Rising and Setting 4.8 Lunar Day, Lunar Time and Surface Structure of Moon 4.9 Earth Shine - Tides Eclipse 4.10 Lunar Eclipse – Solar Eclipse 4.11 Condition for the Occurrence of Lunar and Solar Eclipse	K1-K5	5	CO1-5	Lecturing Group Discussion	Questioning
Feb 27- Mar 6, 2025 (Day Order 1 to 6) (5 hours)	4 5	Eclipse 4.12 Maximum and Minimum Number of Eclipses Near the Node of Lunar Orbit, Maximum Number of Eclipses in a Year 4.13 Eclipse Seasons - Effect of Refraction on a Lunar Eclipse – Importance of Total Solar Eclipse 4.14 Occultations Time 5.1 Seasons and its Causes	K1-K5	5	CO1-5	Lecturing Flipped Classroom	Slip Test

Mar 7 – 11, 2025 (Day Order 1 to 3) (2 hours)	5	Time 5.2 Calendar 5.3 Conversion of Time	K1-K5	2	CO1-5	Lecturing Flipped Classroom	Questioning
Mar 12 –17, 2025	C.A. Test – II [Unit 3, Unit 4 – 4.5 to 4.11]						
Mar 18 – 20, 2025 (Day 4 to 6) (3 hours)	5	Time 5.4 Simple Problems Based on the Concepts Only	K1-K5	3	CO1-5	Lecturing Problem Solving	Third Component Test [20 marks] (Unit 5 – Sections 5.1 to 5.3)
Mar 21 - 28, 2025 (Day Order 1 to 6) (5 hours)	5	Telescope Setting & Sky Observation Setting of Telescope Stars, Star Clusters and Constellations Moon and Planets Nebulae Eclipse (Depends on the Occurrence)	K1-K5	5	CO1-5	Night Sky Observation	Questioning
Mar 29- April 2, 2025 (Day Order 1 to 3) (2 hours)	REVISION						