STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (June - November 2026)

Department : **MATHEMATICS**

Name/s of the Faculty : **Dr. Fancy V. F. & Dr. Chinthamani S. (2+3 hours)**

Course Title : **DIFFERENTIAL CALCULUS**

Course Code : **25MT/MC/DC15**

Shift : **I**

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	recall concepts of differentiation, curvature, and envelopes.	**K1**
CO2	understand implicit functions, curvature, and envelopes	**K2**
CO3	apply differentiation techniques to solve problems related to curvature and envelopes.	**K3**
CO4	analyze and compare functions using higher-order derivatives and curvature properties.	**K4**
CO5	assess and solve mathematical problems involving differentiation and concepts in curvature.	**K5**

Week	**Unit No.**	**Content**	**Cognitive Level**	**Teaching Hours**	**COs**	**Teaching Learning Methodology**	**Assessment Methods**
Jun 22, 2026 (Day Order 6)		Introduction to Differential Calculus and briefing of preliminaries	K1-5	1	CO1-5	Lecture, Problem Solving	Group Discussion
Jun 23 – July 1, 2026 (Day Order 1- 6)	I II	**Successive Differentiation** 1.1 The n^{th} derivative 1.2 Standard results **Total Differentiation** 2.1 Total differential coefficient 2.2 Special cases	K1-5	2+3	CO1-5	Lecture, Problem solving	Oral Test
July 2 – July 8, 2026 (Day Order 1- 6)	I II	**Successive Differentiation** 1.2 The n^{th} derivative 1.2 Standard results **Total Differentiation** 2.2 Special cases 2.3 Implicit functions	K1-5	2+3	CO1-5	Lecture, Problem solving	Debate Quiz

July 9 – 16, 2026 (Day Order 1- 6)	I II	**Successive Differentiation** 1.3 Fractional expressions **Total Differentiation** 2.4 Homogenous functions	K1-5	2+3	CO1-5	Lecture, Problem solving and Summary using LUMI	Quiz using LUMI
July 17 – 24, 2026 (Day Order 1- 6)	I II	**Successive Differentiation** 1.4 Trigonometrical transformation 1.5 Formation of equations involving derivatives **Total Differentiation** 2.5 Partial derivatives of a function of two functions	K1-5	2+3	CO1-5	Lecture, Problem solving	**III Component:** Assignment (10 marks) (Secs. 2.1, 2.2 & 2.3)
July 25 – 28, 2026 (Day Order 1- 3)	I III	**Successive Differentiation** 1.5 Formation of equations involving derivatives **Envelopes** 3.1 Definition of	K1-5	1+2	CO1-5	Lecture, Problem solving	Games using Mindmap

		envelopes					
July 29 – Aug 3, 2026	**C.A. Test I** [Portions: Unit 1 - Sec 1.1 – 1.5 & Unit 2]						
Aug 4 - 6, 2026 (Day Order 4 - 6)	I III	**Successive Differentiation** 1.5 Formation of equations involving derivatives **Envelopes** 3.2 Method of finding the envelope	K1-5	1+1	CO1-5	Lecture, Problem solving	Slip Test
Aug 7 – 14, 2026 (Day Order 1- 6)	I III	**Successive Differentiation** 1.6 Leibnitz's theorem for the nth derivative of the product of two function **Envelopes** 3.2 Method of finding the envelope	K1-5	2+3	CO1-5	Lecture using Online tool and Problem solving	Group Discussion
Aug 17 - 24, 2026 (Day Order 1- 6)	I	**Successive Differentiation** 1.6 Leibnitz's theorem for the nth derivative of	K1-5	2+3	CO1-5	Lecture, Problem solving	Slip Test

	III	the product of two function **Envelopes** 3.3 Another definition of the envelope					
Aug 25 – Sep 2, 2026 (Day Order 1- 6)	V III	**Evolute and Involute** 5.1 Definition of evolute and involute 5.2 Radius of curvature in polar coordinates **Envelopes** 3.4 Envelope of family of curves	K1-5	2+3	CO1-5	Lecture, Problem solving	Group Discussion
Sep 3 – 11, 2026 (Day Order 1- 6)	V IV	**Evolute and Involute** 5.2 Radius of curvature in polar coordinates **Curvature** 4.1 Definition of curvature 4.2 Circle, radius and centre of curvature	K1-5	2+3	CO1-5	Lecture, Problem solving	**III Component:** Assignment problem Test (20 marks) (Secs. 1.5 & 1.6)

Sep 15-17, 2026 (Day Order 1 - 3)	V IV	**Evolute and Involute** 5.2 Radius of curvature in polar coordinates 5.3 p-r equation **Curvature** 4.2 Circle, radius and centre of curvature	K1-5	1+2	CO1-5	Lecture, Problem solving	Group Discussion
Sep 18 –23, 2026	**C.A. Test – II [Unit III & Unit V – Secs 5.1 – 5.3]**						
Sep 24 - 28, 2026 (Day 4 – 6)	V IV	**Evolute and Involute** 5.2 Radius of curvature in polar coordinates 5.3 p-r equation **Curvature** 4.2 Circle, radius and centre of curvature	K1-5	1+1	CO1-5	Lecture, Problem solving	Oral Test
Sep 29 – Oct 7, 2026 (Day Order 1 - 6)	V IV	**Evolute and Involute** 5.3 p-r equation; pedal equation of a curve **Curvature** 4.3 Cartesian formula for the radius of curvature	K1-5	2+3	CO1-5	Lecture, Problem solving	**III Component:** Written Test (20 marks) (Secs. 2.4, 2.5, 3.1 & 3.2)

Oct 8 - 14, 2026 (Day Order 1 - 6)	V IV	**Evolute and Involute** 5.3 p-r equation; pedal equation of a curve **Curvature** 4.4 Coordinates of the centre of the curvature	K1-5	2+3	CO1-5	Lecture, Problem solving	Group Discussion of an application scenario
Oct 15 - 21, 2026 (Day Order 1- 4)	**REVISION** (All units)						