SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2021-2022

(Bachelor of Science) (Mathematics)
(B.Sc.) (Mathematics) Semester (I)

Course Code	US01CMTH52	Title of the Course	Problem Solving and Exercises in Calculus
Total Credits of the Course	02	Hours per Week	04

Course Objectives:	1. To teach Calculus in more depth.
	2. To make practice of drawing curves in plane.
	3. To teach Calculus of functions in two and three variables.

Course Content		
Unit	Description	Weightage* (%)
1.	Hyperbolic Functions: Definition and Properties; Derivatives and Integrations of Hyperbolic Functions; Inverse Hyperbolic Functions and it's Derivative; Successive Derivative: Higher Order Derivatives; nth Derivatives of Standard Forms; Leibnitz's Theorem and its Applications;	10
2.	Indeterminate Forms: L'Hospital's Rule; $\frac{0}{0}, \frac{\infty}{\infty}, \infty - \infty, 0.\infty, 0^0, 1^\infty, \infty^0$ forms.	10
3.	Curve Tracing in Cartesian Coordinates using Symmetry, Intercepts, Asymptotes and Sign of the Function; Curve Tracing in Parametric Equations using Intercepts, Tangents parallel to axes, Asymptotes parallel to the axes, Oblique Asymptotes and Extent to the Curve;	10
4.	Equations of Tangent and Normal to the Curve at a given point; Cycloid: Definition and Equations; Curve tracing in Polar coordinates using Symmetry, Closeness, Extent and Some points; Polar equation of Conics	10
5.	Reduction Formulae for Integration of $sin^n x, cos^n x, sin^p x. cos^q x, tan^n x, cot^n x, sec^n x, cosec^n x$; Evaluation of Reduction Formulae using Properties of Definite Integration and it's Applications	10
6.	Arc length: Definition, Arc length of Cartesian, Parametric and Polar Curves; Intrinsic Equation of a Curve: Derivation of Formula and Examples; Curvature, Radius of Curvature for Cartesian, Parametric and Polar Equations; Length of Arc as a Function	10

Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2021-2022

7.	Function of Two Variables, Neighborhood of a Point in Plane; Partial Derivatives, Partial Derivatives of Higher Orders; Homogeneous Function; Euler's Theorem on Homogeneous Function of Two Variables and it's Corollaries;	10
8.	Theorem on Total Differentials; Differentiation of Composite Functions; Euler's Theorem on Homogeneous Function of Three Variables; Differentiation of Implicit Functions;	10

Teaching-Learning Methodology	Classroom teaching, Presentation by students, Group discussion, Use of ICT whenever required.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	----
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	20%
3.	University Examination	80%

Course Outcomes: Having completed this course,	
1.	Students will realize the power of Leibnitz's Theorem and L'Hospital's Rule.
2.	Students will be able to find areas and surface areas using basic Calculus.
3.	Students will be able to take us course of Calculus of multivariable functions.

Suggested References:	
Sr. No.	References
1.	Shanti Narayan, Differential Calculus, 14th Edition, S. Chand & Company Ltd., New Delhi, 1996 Chapter: 5, 6(6.6 Only), 9, 10, 12(12.1, 12.2, 12.3 Only)
2.	Shanti Narayan, Integral Calculus, 14th Edition, S. Chand & Company Ltd., New Delhi, 1996 Chapter: 4(Except 4.7, 4.8, 4.9), 8(Except 8.5)
3.	H. M. Vasavda, Analytic Geometry of Two and Three Dimensions, 1992 Chapter: 2(Only 11, 12, 13), 3, 4(1 to 5)

On-line resources to be used if available as reference material
On-line Resources

*****