Programme: Certificate Class: B.Sc.	Year: First	Semester: I

Subject: Mathematics	
Course Code: BMA-C111	**Course Title: Calculus**

Course Outcome	CO1: Foundation knowledge for the students to understand basics of mathematics including applied aspect for developing enhanced quantitative skills and pursuing higher mathematics and research as well. CO2: Understand successive differentiation, maxima and minima, asymptotes and curve tracing in polar, cartesian as well as parametric curves. CO3: Understand theBeta and Gamma functions, double and triple integrals with applications.

Unit No.	Course Content	Hours
I	Successive differentiation, nth differential coefficients of a function, Leibnitz theorem, Expansion of functions: Maclaurin's and Taylor's theorems.	12
II	Partial differentiation: Partial derivatives of first and higher orders, Total differential coefficient, First and second order differential coefficient of an implicit function, Homogenous functions, Euler's theorem on homogenous function. Maxima and minima upto two independent variables.	12
III	Asymptotes: Parallel asymptotes, Asymptotes of an algebraic curve, Asymptotes of non-algebraic curve, Asymptotes of polar curves, Position and nature of double point, Curve tracing for Cartesian form of the curves, Curve tracing for polar form of the curves.	12
IV	Beta function, Gamma function and their properties, Relation between beta and gamma functions, Duplication formula. Rectification(Lengths of curves), Quadrature(Area of curves), Volumes and Surfaces of solids of revolution.	12
V	Double integration, Evaluation of double integral, Change of order of integration, Application of the double integrals, Triple integration, Change to spherical co-ordinates, Application of triple integrals	12

Suggested Readings:

1. R.G. Bartle & D.R. Sherbert: Introduction to Real Analysis, John Wiley & Sons
2. S. BalachandraRao& C. K. Shantha: Differential Calculus, New Age Publication.
3. H. Anton, I. Birens and S. Davis: Calculus, John Wiley and Sons, Inc., 2002.
4. G.B. Thomas and R.L. Finney: Calculus, Pearson Education, 2007
5. Shanti Narayan & Dr. P.K. Mittal: Integral Calculus, S.Chand
6. Schaum'sOutlineofCalculus -FrankAyresandElliottMendelson,5thed.USA:Mc.Graw.
7. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons.
8. Gorakh Prasad: Differential Calculus, Pothishala Publication
9. B.S.Grewal: Higher Engineering Mathematics, Khanna Publishers
10. Suggested digital plateform:NPTEL/SWAYAM/MOOCs

Mappingofcourseoutcomeswithprogramoutcomes&programspecific outcomes

CO's No.	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	1	2	3	3	3
CO2	3	3	3	3	1	2	3	3	3
CO3	3	3	3	3	1	2	3	3	3

Note: 1-Low, 2-Medium, 3-High