



SEMESTER – I

BRANCH	Subject Title	Subject Code
B.Sc. (Mathematic – MINOR/GENERIC ELECTIVE COURSE)	CALCULAS AND DIFFERENTIAL EQUATIONS	MAM2/MA

Course learning outcomes:-

The course will enable the students to:

1. Sketch curves in a plane using its Mathematical properties in the different coordinate systems of reference.
2. Using the derivatives in Optimization, Social sciences. Physics and Life sciences etc.
3. Formulate the Differential equations for various Mathematical models.
4. Using techniques to solve and analyze various Mathematical models.

Unit -1

1.1 Historical background:

1.1.1 Development of Indian Mathematics: Ancient and Early Classical Period (till 500 CE)

1.1.2 A brief biography of Bhaskaracharya (with special reference to Lilavati) and Madhava

1.2 Successive differentiation

1.2.1 Leibnitz theorem

1.2.2 Maclaurin's series expansion

1.2.3 Taylor's series expansion

1.3 Partial Differentiation

1.3.1 Partial derivatives of higher order



1.3.2 Euler's theorem on homogeneous functions

1.4 Asymptotes

1.4.1 Asymptotes of algebraic curves

1.4.2 Condition for Existence of Asymptotes

1.4.3 Parallel Asymptotes

1.4.4 Asymptotes of polar curves

Unit - 2

2.1 Curvature

2.1.1 Formula for radius of Curvature

2.1.2 Curvature at origin

2.1.3 Centre of Curvature

2.2 Concavity and Convexity

2.2.1 Concavity and Convexity of curves

2.2.2 Point of Inflexion

2.2.3 Singular point

2.2.4 Multiple points

2.3 Tracing of curves

2.3.1 Curves represented by Cartesian equation

2.3.2 Curves represented by Polar equation

Unit - 3

3.1 Integration of transcendental functions

3.2 Introduction to Double and Triple Integral

3.3 Reduction formulae



3.4 Quadrature

3.4.1 For Cartesian coordinates

3.4.2 For Polar coordinates

3.5 Rectification

3.5.1 For Cartesian coordinates

3.5.2 For Polar coordinates

Unit - 4

4.1 Linear differential equations

4.1.1 Linear equation

4.1.2 Equations reducible to the linear form

4.1.3 Change of variables

4.2 Exact differential equations

4.3 First order and higher degree differential equations 4.3.1 Equations solvable for x, y and p

4.3.2 Equations homogenous in x and y

4.3.3 Clairaut's equation

4.3.4 Singular solutions

4.3.5 Geometrical meaning of differential equations

4.3.6 Orthogonal trajectories

Unit -5

5.1 Linear differential equation with constant coefficients

5.2 Homogeneous linear ordinary differential equations.

5.3 Linear differential equations of second order

5.4 Transformation of equations by changing the dependent/ independent variable

5.5 Method of variation of parameters.