

B.Tech Biotechnology.: Semester-I BBT-101 – Elementary Mathematics –I	
<b>Teaching Scheme</b>	<b>Examination Scheme</b>
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

**Course Objective:**

To understand Mathematical sciences applications in biotechnology, population genetics

**Course Learning Outcomes:**

After completing the course, the student shall be able to:

CO1: To develop basic understanding of mathematics to explore its applied role in life sciences

**UNIT- I Derivatives**

**Derivatives:** Definition, algebra of derivatives of functions, Derivatives of polynomial and trigonometric functions, Exponential and Logarithmic function, Logarithmic differentiation, derivatives of function in parametric forms, Second order derivatives, nth order derivatives, Leibnitz's Theorem, Taylor's series, Maclaurin's series, Mean Value Theorems, Vector differentiation: Gradient, Divergence and Curl

**Applications of Derivatives** Applications of derivatives: rate of change, increasing/decreasing functions, tangents & normals, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations), Partial and Total Differentiation, Envelopes and Radius of curvature, Jacobians.

**UNIT- II Integrals**

**Integrals** Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, only simple integrals of the type to be evaluated. Definite integrals as a limit of a sum, Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals. Multiple integrals: Volume, Surface integrals, Vector Integration: Stokes theorem, Gauss's Theorem. Gamma, Beta Functions. Complex integration: Analytic function and Cauchy integral theorem.

**Applications of the Integrals** Applications in finding the area under simple curves, especially lines, areas of circles/parabolas/ellipses (in standard form only), area between the two above said curves (the region should be clearly identifiable). Fourier series, Laplace Transformation, Fourier Transformation.

**UNIT –III Differential Equations**

**Differential Equations** Definition, order and degree, general and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations by method of separation of variables, homogeneous differential equations of first order and first degree. Solutions of linear differential equation of first order.

Head

Department of Mathematics

Dean

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