Semester*	: III
Course Type	: IDC
Course Code**	: MAT-IDC-201
Name of the Course	: Basic Calculus
Learning level***	: 200
Credits	: 3
Contact Hours	: 45
Total Marks	: 100
End Semester Marks	: 70
Internal Marks	: 30

Course Objective

This is an interdisciplinary course on basic Calculus for the students outside the discipline of mathematics. The course is developed in order to introduce the basics and simple applications in both differential and integral calculus with some simple but effective real life examples. The main objective of this course;

1. Course introduces the concept of limit and continuity.
2. It develops the skill of differentiation and integration.
3. To introduce the skill of implementing Calculus to solve various real life problems.

Unit I

Real valued functions, some standard functions (polynomial, trigonometric, exponential and logarithmic) functions. Definition of limit of function, Algebra of limits (Definition only) and related problems on limit. Definition of continuity of real valued functions.

Unit II

Derivatives of standard functions - polynomial, exponential, trigonometric, logarithmic. Product rule, quotient rule for derivatives. Concept of higher order derivatives.

Unit III

Application of derivatives as a rate measurer, simple problems on area, perimeter, volume. To find the maximum and minimum of a function (Using 2^{nd} derivative test only). Definition of monotone function. To find the interval at which function is monotone.

Unit IV

Definition of integration. Integration as anti differentiation of simple functions. Integration by substitution. Integration by partial fractions. Integration by parts.

Unit V

Fundamental Theorem of Integral Calculus (Statement only). Definite Integral and its properties (without proof). Problems on definite integrals using properties. Application of definite integrals to find the area between the simple curves.

Textbooks:

1. B.C. Das and B.N. Mukherjee; Differential Calculus, U.N. Dhur and Sons.(Unit I-III)
2. BC Das and B.N. Mukherjee; Integral Calculus, U.N. Dhuri and Sons.(Unit IV-V).

Reference books:

1. Santinarayan; Differential Calculus
2. Santinarayan; Integral Calculus

Course Outcome:

On developing the concept and skill of basic calculus the following outcomes can be expected from the learner.

1. The learner is able to solve the problems on limits and continuity of different functions: constant function, polynomial function, trigonometric function, rational function, modulus function and step functions.
2. The learners can implement the concept and tool of differentiability and integration to solve real life problems such as: Rate of change of area, Increasing decreasing, Maximum and Minimum, Cost and Revenue problems etc.
3. Interested learners can extend the knowledge of calculus exploring different advanced topics such as: Cauchy's criterion of existence of limit, Sequential continuity, Leibnitz Theorem, Rectification etc.