

# **MT - 171 Differential & Integral Calculus**

## **Complex Number**

Argand diagram, De Moivre formula, root of polynomial equations, curve and regions in the complex plane, standard functions and their inverses (exponential, circular and Hyperbolic functions).

## **Limits and Continuity**

Bounds and bounded sets, Limit point of sets, Sequences, Convergence of sequences monotonic sequences, Function and their graph, limit of function and continuous functions.

## **Differential Calculus**

Differentiation and Successive differentiation and its application; Leibnitz theorem, Taylor and Maclaurin theorems with remainders in Cauchy and Lagrange form, Taylor and Maclaurin series, L' Hopitals rule, extreme values of a function of one variable using first and second derivative test, asymptotes of a function, curvature and radius of curvature of a curve, partial differentiation, exact differential and its application in computing errors. Multivariate functions, Maxima and Minima for multivariate functions, Maxima Minima under certain conditions (Lagrange Multiplier).

## **Integral Calculus**

Indefinite integrals and their computational techniques, reduction formulae, definite integrals and their convergence, Beta and Gamma functions and their identities, double and triple integration with applications. (Area, volume, centeroid, inertia, arc length).

## **Vectors Calculus**

Scalar and Vector quantities, physical and geometrical meanings, Algebra of vectors, Scalar and vector triple products.

Vector derivatives. Line and surface Integrals. Gradient of a Scalar.

## **Recommended Books**

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| 1. Engineering Mathematics                             | Anthony Croft   | Second Edition |
| 2. Calculus  | Thomas & Finney | 1994           |
| 3. Engineering Mathematics                             | K.A. Stroud     | Fourth         |
| 4. Calculus & Analytical Geometry                      | Howard Anton    | Fifth          |
| 5. Complex Analysis for<br>Mathematics and Engineering | John H. Mathews | 2001           |