

NIRMA UNIVERSITY
Institute of Technology
B. Tech. First Year Semester: I

MA101, Calculus (Common for all UG Programme)

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CLOs:

On completion of the course student

- 1. will be able to find higher ordered derivatives and hence represent function in power series of (x-a)**
- 2. will apply the knowledge of function of several variables, its derivatives in engineering problems**
- 3. will apply the knowledge of special functions (Gamma, Beta, Elliptic, Error) and its application in engineering problems**
- 4. will apply the knowledge of multiple integration and its application in engineering problems.**

Syllabus:

Unit I: Differential Calculus

Review of limits, continuity and differentiability, Successive differentiation, Leibnitz theorem (without proof), Indeterminate forms, Taylor's and Maclaurin's expansion of single variable, Partial Differentiation, Total derivative, Chain Rule, Implicit function, Euler's theorem and its applications, Taylor's and Maclaurin's expansion of function of several variables, Maxima and Minima of function of several variables, Lagrange's method of undetermined multipliers, Jacobian.

Unit II: Integral Calculus

Review of proper and improper integrals, Reduction formulae, Beta-Gamma functions, Error function, Tracing of curves, Rectification, Quadrature, Volume of solid of revolution, Area of surface of revolution, Double integral and evaluation, Change of order of integration, Change of variable, Triple integral and evaluation, Area using double integration, Volume as double and triple integration, Volume of solid by double integration.

References:

1. Thomas' Calculus (Latest edition), Pearson publication.

2. G B Thomas and R. L. Finney, Calculus and Analytic Geometry (Latest edition), Narosa Publication, Delhi.
3. James Stewart, Calculus (Latest edition), Thomson Learning.
4. B. S. Grewal, Higher Engineering Mathematics, (Latest edition) Khanna publication, Delhi.
5. Dr. K. R. Kachot, Higher Engineering Mathematics Vol I (Latest edition), Mahajan Publication, Ahmedabad.
6. Sharma and Yeolekar, Engineering Mathematics Vol. I. (Latest edition), PHI, New Delhi.