

BMS COLLEGE OF ENGINEERING, BANGALORE – 560019
MATHEMATICS DEPARTMENT
SYLLABUS (2011 - 2012)
FIRST SEMESTER B.E COURSE - (Common to all branches)

Course Name	Engineering Mathematics -1	Course Code	11MA1ICMAT
Credits	04	L – T - P	3 -1- 0
Contact hours	52 hours (40L+12T)		

Objectives:

To acquaint the students with principles of mathematics through Calculus and Differential Equations, that serves as an essential tool in several applications.

Course outcomes:

Students on completion of the course will

- i) Apply the standard calculus computations on parametric and polar curves.
- ii) Apply the concepts of functions of several variables.
- iii) Demonstrate an understanding towards the nature of curves by tracing the same using certain properties.
- iv) Apply integration to find arc lengths and areas.
- v) Use analytic techniques to compute solutions to ordinary differential equations.

UNIT-1

DIFFERENTIAL CALCULUS - 1

[13 hours]

Introduction to n^{th} derivatives of standard functions (self-study), Illustrative examples on Leibnitz's theorem (without proof). Rolle's theorem-geometrical interpretation, Lagrange's and Cauchy's mean value theorems (with proof). Taylor's and Maclaurin's series expansions for function of one variable. **(6L + 2T)**

Polar curves: angle between radius vector and tangent, angle between the polar curves, length of the perpendicular from pole to the tangent, pedal equations of polar curves. **(4L + 1T)**

UNIT-2

DIFFERENTIAL CALCULUS -2

[13 hours]

Indeterminate forms – L'Hospital's rule (without proof)

(2L+1T)

Partial differentiation: Partial derivatives, total differentiation, differentiation of composite and implicit functions, Jacobians and their properties (without proof).

(4L+1T)

Taylor's and Maclaurin's series expansions for functions of two variables. Maxima and Minima for functions of two variables. Leibnitz's rule for differentiation under the integral sign (without proof) - Illustrative examples with constant limits. **(4L+1T)**

UNIT-3

INTEGRAL CALCULUS

[9 hours]

Reduction formulae for the integration of $\sin^n x$, $\cos^n x$, $\sin^m x \cos^n x$ (m and n being positive integers) and evaluation of these integrals with standard limits. Tracing of standard curves: Cartesian form- Strophoid, Lemniscate, Parametric form - Cycloid, Astroid, Polar form - Cardioid, Lemniscate. **(5L+1T)**

Expressions for Derivatives of arc length (cartesian and polar form-without proof). Area under a plane curve, length of a plane curve, illustrative examples on volume of revolution and surface area of revolution by a given curve (without proof). **(2L+1T)**

UNIT-4

ORDINARY DIFFERENTIAL EQUATIONS - 1[9 hours]

Solution of first order and first degree differential equations-variables separable (self-study), Homogeneous equations, equations reducible to homogeneous equations, linear equations, Bernoulli's equation, exact equations. Orthogonal Trajectories.

(7L+2T)

UNIT-5

ORDINARY DIFFERENTIAL EQUATIONS - 2

[8 hours]

Linear differential equations of second and higher order with constant coefficients, method of variation of parameters, solutions of Cauchy's homogenous linear equations and Legendre's equations. **(6L+2T)**

Text Books

1. Advanced Engineering Mathematics, Erwin Kreyszig, 8th edition, 2007, Wiley-India
2. Higher Engineering Mathematics, B.S. Grewal, 40th edition, 2007, Khanna Publishers.

Reference Books:

1. Higher Engineering Mathematics, B.V. Ramana, 7th reprint, 2009, Tata Mc. Graw Hill.
2. Advanced Engineering Mathematics, P. V. O'Neil, 5th Indian reprint, 2009, Cengage learning India Pvt. Ltd.

Question Paper Pattern

1. Each unit consists of one full question.
2. Each full question consists of three or four subdivisions.
3. Five full questions to be answered.
4. Internal Choice in Unit 1 and Unit 2.