

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)		

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.

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

Course Name	Engineering Mathematics -2	Course Code	11MA2ICMAT
Credits	04	L – T - P	3 -1- 0
Contact hours	52 hours (40L+12T)		

UNIT-1

VECTOR CALCULUS

[13 hours]

Scalar and vector point functions, vector differentiation (self-study), Gradient, Divergence, Curl, Laplacian, solenoidal, irrotational vectors. Vector identities: $\text{div}(\phi\vec{A})$, $\text{curl}(\phi\vec{A})$, $\text{curl}(\text{grad}\phi)$, $\text{div}(\text{curl}\vec{A})$, $\text{div}(\vec{A}\times\vec{B})$ and $\text{curl}(\text{curl}\vec{A})$ **(6L+2T)**

ORTHOGONAL CURVILINEAR COORDINATES (OCC):

Definitions - Orthogonal curvilinear coordinates, scale factors, base vectors, orthogonality of cylindrical and spherical coordinate systems, expressing a given vector in cylindrical and spherical coordinates. Expressions for gradient, elementary arc length, divergence, elementary volume, curl and Laplacian in orthogonal curvilinear coordinates (without proof). **(4L+1T)**

UNIT-2

INTEGRAL CALCULUS

[13 hours]

Multiple Integrals – Double integrals, evaluation of double integrals by change of order of integration, evaluation of double integrals by changing to polar form, computation of area using double integrals, Triple integrals, computation of volume using triple integrals. **(6L+2T)**

Vector integration – Line integrals, surface integrals, Green's theorem, Stokes' theorem and Gauss divergence theorem (without proof, statement and problems). **(4L+1T)**

UNIT-3

MATRICES

[8 hours]

Elementary row transformations, Echelon form of a matrix, rank of a matrix by elementary row transformations. Consistency of system of linear equations and solution. Solution of a system of non-homogenous equations: Gauss elimination method, Gauss-Seidel method, LU decomposition method. Characteristic values and Characteristic vectors of matrices. **(6L+2T)**

UNIT-4

LAPLACE TRANSFORMS

[8 hours]

Definitions, properties, transforms of elementary functions, transforms of derivatives and integrals, properties, Periodic function, Unit step function and impulse function. **(6L+2T)**

UNIT-5

INVERSE LAPLACE TRANSFORMS

[10 hours]

Inverse Laplace Transforms-properties, Convolution theorem. Solution of ordinary differential equations using Laplace transforms (initial and boundary value problems). **(5L+1T)**

BETA AND GAMMA FUNCTIONS

Beta & Gamma functions- Properties, relation between Beta & Gamma functions. **(3L+1T)**

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1. Advanced Engineering Mathematics, Erwin Kreyszig, 8th edition, 2007, Wiley-India.
2. Higher Engineering Mathematics, B.S. Grewal, 40th edition, 2007, Khanna Publishers.
3. Higher Engineering Mathematics, B. V. Ramana, 7th reprint, 2009, Tata Mc. Graw Hill

Reference Books:

1. Advanced Modern Engineering Mathematics, Glyn James 3rd edition, 2004, Pearson Education.
2. Advanced Engineering Mathematics, P. V. O'Neil, 5th Indian reprint, 2009, Cengage learning India Pvt. Ltd.

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