

APPLIED MATHEMATICS-II

Paper Code : ETMA-102

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INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.

Unit –I

Partial differentiation and its Applications: Partial derivatives of first and second order. Euler's theorem for homogeneous functions (without proof). Derivatives of Implicit Functions, total derivatives. Change of variables. Jacobian. Taylor's theorem for function of two variables (without proof). Error and approximation. Extreme values of function of several variables (maxima, minima, saddle points). Lagrange method of undetermined multipliers. Partial differential equations: Formulation, solution of first order equations, Lagrange's equations, Charpit's method.

[T2][No. of 12hrs.]

Unit-II

Laplace Transformation: Definition, Laplace transformation of basic functions, existence condition for Laplace transformation, Properties of Laplace transformation (Linearity, scaling and shifting). Unit step function, Impulse Function, Periodic Functions. Laplace transformation of derivatives, Laplace transformation of integrals, differentiation of transforms, Integration of transforms, Convolution theorem, inverse Laplace transformation. Solution of ordinary Differential equations.

[T1, T2] [No. of 12hrs.]

Unit-III

Complex Function: Definition, Derivatives, Analytic function, Cauchy's Riemann equation (without proof). Conformal and bilinear mappings, Complex Integration: Complex Line integration, Cauchy's integral theorem and integral formula (without proof). Zeros and Singularities, Taylor's and Laurent's series (without proof). Residues, Residue theorem (without proof). Evaluation of real definite integrals: Integration around the unit circle, Integration around a small semi circle and integration around rectangular contours.

[T1, T2][No. of 12hrs.]

Unit-IV

Multiple integrals: Double integrals, Change of order of integration, Triple integrals. Vector Calculus: Scalar and vector functions, Gradient, Divergence and curl. Directional derivatives, Line Integrals. Surface integrals, volume integrals. Green's theorem, Stoke's theorem and Gauss divergence theorem (without proof).

[T1, T2][No. of 12hrs.]

Text:

[T1]. E. Kresyzig, "Advance Engineering Mathematics", Wiley publications

[T2] Michael Greenberg, "Advance Engineering mathematics", Pearson.

References:

[R1] R.K. Jain and S.R.K. Iyengar, "Advanced Engineering Mathematics" Narosa Publications

[R2] B. S. Grewal, "Higher Engineering Mathematics" Khanna Publications.

[R3] S. Ponnusamy, "Foundation of Complex Analysis" Narosa Publication

[R4] G.B. Thomas and R. N. Finny "Calculus and Analytic Geometry" Addison Wesley/ Narosa

[R5] Wylie R, "Advance Engineering mathematics", McGraw-Hill

[R6] M. Spiegel, "Schaum's Outline on Laplace Transform, Tata McGraw-Hill

