

ENGINEERING MATHEMATICS - II*(For all branches except Biotechnology)*

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Objective of the Course :

Without mathematics not a single day of an engineer will pass! All the topics of this course are relevant to all branches of engineering. In real life, many quantities are dependent on more than one quantity. Hence study of functions of several variables is crucial. In this course, we study partial differentiation, partial differential equations, multiple integrals all involving functions of two variables. We also study Fourier series and Z-transformations and difference equations.

UNIT - I

Partial Differential Equations : Formation of Partial Differential Equations, Linear (Lagrange) Equations, Method of multipliers, Non-linear partial differential equations (Types), Charpit's method.

Second order linear equations, classifications, Solution by method of separation of variables.

UNIT - II

Fourier Series : Periodic functions, Fourier series, Dirichlet's conditions, Determination of Fourier coefficients, Discontinuous functions, even and odd functions, Half-range series, Functions having arbitrary period.

UNIT - III

Z-transformations : Sequences, Z-transformation, Properties, Inverse Z-transformation, Multiplication and division by k, Initial and final value theorems, Convolution, Determination of inverse Z-transformation.

Applications : Solutions of difference equations using Z-transformations.

UNIT - IV

Multiple Integrals : Double integrals, Evaluation, Evaluation in Polar coordinates, Change of order of integration, Change of variables, Applications to Area in Cartesian coordinates and polar coordinates.

Triple integrals, Fundamentals, Evaluation of triple integrals.

UNIT - V

Vector Differentiation and Integration : Vector Function, Differentiation, Scalar and Vector point function, Gradient, Normal, Divergence, Directional Derivate, Curl, Vector identities.

Line Integral, Surface Integral, Volume integral, Green's theorem, Stoke's theorem, Gauss theorem of divergence (without proofs).

TEXT BOOKS :

1. *H. K. Dass and Er. Rajnish Verma*, Higher Engineering Mathematics, S. Chand & Co., New Delhi, 2011.
2. *B.S. Grewal*, "Higher Engineering Mathematics", 40th edition, Khanna Publishers, 2009.

REFERENCE BOOKS :

1. *B.V. Ramana*, "Higher Engineering Mathematics", 3rd Edition, Tata McGraw-Hill Publishing Co, 2008.
2. *R K Jain, S R K Iyengar*, "Advanced Engineering Mathematics", 2nd Edition, Narosa Publishing House.
3. *Erwin Kreyszig*, "Advanced Engineering Mathematics", 8th Edition, John Wiley & Sons (Asia) Pvt. Ltd. 2001.