

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

DEPARTMENT OF MATHEMATICS

B.Tech. Second Semester

BASIC ENGG. MATHEMATICS – II

(Theory Periods – 40, Tutorial periods - 12)

Unit – I Group, Ring, Field and Vector Space : Definition and examples of Group, Ring and Field, Vector Space: General Properties of Vector spaces, Vector subspaces, Algebra of subspaces, Linear span, Linear sum of two subspaces, Linear dependence and linear independence of vectors, Basis of a vector space, Finite dimensional vector spaces, Dimension of a vector space, Dimension of a subspace.

Unit – II Differential Equations of higher order: Linear differential equations of higher order with constant coefficients, method of variation of parameters, Cauchy's and Legendre's linear equations, simultaneous linear equations with constant coefficients.

Unit – III Multiple Integrals: Double and triple integrals, change of order of integration, Beta and Gamma functions, Application to area and volume, Centre of gravity.

Unit – IV Vector Calculus: Vector operator ∇ ; directional derivative, gradient, divergence and curl; line, surface & volume integrals, Green's , Gauss's & Stoke's theorem (without proof) & applications.

Unit - V Matrices and Sequence of Real Numbers: Matrices: Rank and inverse by elementary transformation, system of linear equations, eigen values & eigen vectors, Caley-Hamilton theorem, Reduction to diagonal form. **Sequences:** Definition, Convergent sequences, Divergent sequences, Bounded sequences, Monotone sequences, Cauchy's theorem on limits, Cauchy's sequences.

TEXT BOOKS:

1. Higher Engineering Mathematics by B.S.Grewal (38th edition)- Khanna Publishers.
2. Advanced Engineering Mathematics by Erwin Kreyszig (8th edition)- John Wiley & Sons.
3. Higher Algebra by H.S. Hall & S.R.Knight- A.I.T.B.S. Publishers.

REFERENCE BOOKS:

1. Integral Calculus by Gorakh Prasad- Pothishala Private Limited.
2. Advanced Engineering Mathematics by R.K.Jain & S.R.K. Iyengar- Narosa Publishing House.
3. Applied Mathematics for Engineers and Physicsts by Louis A. Pipes- Mc Graw Hill.

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