18MAB101T CALCULUS AND LINEAR ALGEBRA L T P C
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Module – 1

Characteristic equation – Eigen values of a real matrix – Eigen vectors of a real matrix – Properties of Eigen values – Cayley-Hamilton theorem – Finding A^{-1} using Cayley-Hamilton theorem – Finding higher powers of A using Cayley-Hamilton theorem – Orthogonal reduction of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformations – Orthogonal matrices – Applications of Matrices in Engineering.

Module – 2

Function of two variables – Partial derivatives – Total differential – Taylor's expansion with two variables upto second order terms – Taylor's expansion with two variables upto third order terms – Maxima and Minima – Constrained Maxima and Minima by Lagrangian Multiplier method – Jacobians of two variables – Jacobians of three variables – Properties of Jacobians and problems – Applications of Taylor's series, Maxima and Minima, Jacobians in Engineering.

Module – 3

Linear equations of second order with constant coefficients when PI = 0 or exponential – Linear equations of second order with constant coefficients when PI = sin x or cos x – Linear equations of second order with constant coefficients when PI = polynomial – Linear equations of second order with constant coefficients when PI = exponential with sin x / cos x – Linear equations of second order with constant coefficients when PI= exponential with polynomial – Linear equations of second order with constant coefficients when PI = polynomial with sin ax or cos ax – Linear equations of second order variable coefficients – Homogeneous equation of Euler type – Homogeneous equation of Legendre's type – Equations reducible to homogeneous form – Variation of parameters – Simultaneous first order equations with constant co-efficient – Applications of Differential equation in Engineering.

Module – 4

Radius of Curvature - Cartesian coordinates – Radius of curvature - Polar coordinates – Circle of curvature – Applications of Radius of curvature in Engineering – Centre of curvature – Evolute of a parabola – Evolute of an ellipse – Envelope of standard curves – Applications of curvature in Engineering – Beta Gamma functions – Beta Gamma functions and their properties – Sequences-Definition and Examples – Series-Types of convergence – Series of positive terms – Test of convergence – Comparison test – Integral test.

Module – 5

Series of positive terms – Test of convergence – Comparison test – Integral test - D'Alemberts Ratio test, Raabe's root test – Convergent of Exponential Series – Cauchy's Root test – Log test – Alternating Series: Leibnitz test – Series of positive and Negative terms – Absolute Convergence – Conditional Convergence – Applications Convergence of series in Engineering

LEARNING RESOURCES

1. B. H. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,2008
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010
5. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008

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5. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002
6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008