## MA1501 Engineering Mathematics – I L-T-P 3-0-0 Cr: 03

**Syllabus:**

1. **Matrix Algebra:** Elementary row and column transformation, inverse of the matrix, reduction to canonical form, rank of the matrix, solution of simultaneous linear equations, characteristic equation, eigen values and eigen vectors, Caley-Hamilton theorem, similarity transformation **6 lectures**
2. **Vector Space:** Basics of vector spaces, sub-spaces, basis, dimension, linear transformations and their representation by matrices, rank and nullity. **8 Lectures**
3. **Differential Calculus:** Limit, continuity and differentiability of functions of several variables, partial derivatives and directional derivatives with their geometrical interpretation, total derivative, derivatives of composite and implicit functions, derivatives of higher order and their commutatively, Euler’s theorem on homogeneous functions, harmonic functions, Taylor’s expansion of functions of two variables, maxima and minima of functions of two variables, Lagrange’s method of multipliers. **10 lectures**
4. **Sequence and Series of Real Number:** Sequences of real numbers, series, notion of convergence and divergence of infinite series – Ratio test, comparison test, Raabe’s test, Root test, alternating series –Leibnitz test, absolute and conditional convergence, power series, radius and interval of convergence of power series. **8 lectures**
5. **Ordinary Differential Equations:** First order differential equations - separable variable, homogeneous, exact, linear and Bernoulli’s form second and higher order differential equations with constant coefficients, operator method, method of variation of parameters, Euler’s equations, system of linear differential equations.  **10 lecture**

**Suggested Readings:**

1. Advance Engineering Mathematics – R. K. Jain and S.R.K. Iyenger, Narosa Publishing House
2. Differential Calculus – Das and Mukherjee – U.N. Dhar and Sons.
3. Advance Engineering Mathematics - E. Kreyszig, 8th Edition, John Wiley and Sons, New York
4. Advance Engineering Mathematics – Wylie and Barrett – Tata McCraw Hill
5. Linear Algebra – K. Hoffmann and R. Kunze – Prentice Hall
6. Grewal, B.S. ‘Higher Engineering Mathematics’, 42nd Edition, Khanna Publications.
7. Apostol, T.M. ‘Calculus’ Volume I & II second edition, John Wiley & sons (Asia) 2005.
8. Introduction to linear Algebra- Gilbert Strang, Wellesley-Cambridge Press.
9. Linear Algebra by Kennete M Hoffman and Ray Kunze, Pearson.