

## UMA002 MATHEMATICS-II

**Linear Algebra:** Row reduced echelon form, Solution of system of linear equations, Matrix inversion, Linear spaces, Subspaces, Dimension and basis, Linear transformation and its matrix representation. Eigen-values, Eigen-vectors, Diagonalisation, Special type of matrices and their properties.

**Complex Variables:** Basics of complex plane, Analytic functions, Cauchy-Riemann equations, Harmonic functions, Elementary functions: Exponential, Trigonometric, Hyperbolic, and their inverses, Complex exponents.

**Ordinary Differential Equations:** Classification and construction of differential equations, Exact differential equations, Bernoulli, Riccati equation, Clairaut form, Second and higher order differential Equations, Solution techniques: Using one known solution, Cauchy - Euler equation Method of undetermined coefficients, Variation of parameters method, Operator method, Engineering applications of differential equations.

**Laplace Transform:** Definition and existence of Laplace transforms and its inverse, Properties of the Laplace transforms, Unit step function, Impulse function, Applications to solve initial and boundary value problems.

**Fourier Series:** Introduction, Fourier series on arbitrary intervals, Half range expansions.

**Partial Differential Equations:** Introduction, First order equations, Lagrange linear equations, Charpits method (including standard forms).

### **Text Books**

1. Krishnamurthy, V.K., Mainra, V.P. and Arora, J.L., *An introduction to Linear Algebra*, Affiliated East West Press (1976).
2. Simmons, G.F., *Differential Equations (With Applications and Historical Notes)*, Tata McGraw Hill (2009) 2<sup>nd</sup> ed.
3. Kasana, H.S., *Complex Variables: Theory and Applications*, Prentice Hall of India (2004) 2<sup>nd</sup> ed.

### **Reference Books**

1. Kreyszig Erwin, *Advanced Engineering Mathematics*, John Wiley (2006) 8<sup>th</sup> ed.
2. Ram Babu, *Engineering Mathematics*, Pearson Education (2009).