



**ACTIVITIES:**

- o Differentiate the method to find rank of a matrix.
- o Differentiate the method to solve given differential equation.
- o Compute numerical solution to D.E and compare with the output obtained by softwares.

**UNIT – I****L-9, T-3**

**MATRICES:** Rank of a matrix, Normal form, Triangular form, Echelon form; Consistency of system of linear equations, Gauss-Jordan method, Gauss elimination method, Gauss-Seidel method.

**UNIT – II****L-9, T-3**

**EIGEN VALUES AND EIGEN VECTORS:** Eigen values, Eigen vectors, Properties (without proofs); Cayley-Hamilton theorem (without proof), Power of a matrix, Diagonalisation of a matrix.

**UNIT – III****L-9, T-3**

**FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS:** Basic Definitions, Variable separable, Homogeneous differential equations, Linear differential equations, Bernoulli's differential equations, Exact and non-exact differential equations.

**UNIT – IV****L-9, T-3**

**HIGHER ORDER ORDINARY DIFFERENTIAL EQUATIONS:** Linear differential equations with constant coefficients, Homogeneous differential equations of second and higher order, Methods to find particular integral when RHS is of the form :  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$  and  $x^n$ .

**UNIT – V****L-9, T-3**

**NUMERICAL METHODS TO SOLVE ORDINARY DIFFERENTIAL EQUATIONS:** Taylor series method, Picard's method, Euler's and modified Euler's method, Runge-Kutta method.

**TEXT BOOKS :**

1. H. K. Dass and Er. Rajanish Verma, "Higher Engineering Mathematics", 3<sup>rd</sup> edition, S.Chand & Co., 2015.
2. B. S. Grewal, "Higher Engineering Mathematics", 44<sup>th</sup> edition, Khanna Publishers, 2018.

**REFERENCE BOOKS :**

1. John Bird, "Higher Engineering Mathematics", Routledge (Taylor & Francis Group), 2018.
2. Srimanta Pal and Subodh C. Bhunia, "Engineering Mathematics", Oxford Publications, 2015.
3. B. V. Ramana, "Advanced Engineering Mathematics", TMH Publishers, 2008.
4. N. P. Bali and K. L. Sai Prasad, "A Textbook of Engineering Mathematics I, II, III", Universal Science Press, 2018.
5. T. K.V. Iyengar et al., "Engineering Mathematics, I, II, III", S. Chand & Co., 2018.