16HS103 ENGINEERING MATHEMATICS - I

UNIT - 1 **L- 9, T-3**

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

UNIT - 2 **L- 9, T-3**

SECOND ORDER 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}, sinax, cosax and x^n.

UNIT - 3 **L- 9, T-3**

APPLICATIONS OF FIRST ORDER DIFFERENTIAL EQUATIONS: Orthogonal trajectories (including polar form), Newton's law of cooling, Law of natural growth and decay.

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

UNIT - 4 **L- 9, T-3**

MAXIMA/MINIMA OF FUNCTIONS OF TWO VARIABLES: Review of partial differentiation - Partial derivatives, Partial derivatives of higher order; Homogeneous function, Euler's theorem, Total differential coefficient, Maxima and Minima of a function of two variables, Conditions for extreme values, Lagrange method of undetermined multipliers.

JACOBIANS : Definition, Properties, Jacobian of implicit functions.

UNIT - 5 **L- 9, T-3**

PARTIAL DIFFERENTIAL EQUATIONS: Formation of partial differential equations, Linear (Lagrange) equations, Method of multipliers, Non-linear partial differential equations (Types), Charpit's method, Second order linear equations with constant coefficients only, Classifications, Rules to find complimentary function and particular integral (special cases).

TEXT BOOKS:

1. H. K. Dass and Er. Rajanish Verma, "Higher Engineering Mathematics", 3rd edition, S. Chand & Co, 2014.
2. B. S. Grewal, "Higher Engineering Mathematics", 44th edition, Khanna Publishers, 2014.
3. Rudra Pratap, "Getting started with MATLAB", Oxford University Publication, 2009.

REFERENCE BOOKS:

1. Srimanta Pal and Subodh C. Bhunia, "Engineering Mathematics", Oxford Publications, 2015.
2. B. V. Ramana, "Advanced Engineering Mathematics", McGraw Hill education, 25th reprint, 2015.