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| **B. TECH 1st SEMESTER** | **T** | **P** | **C** |
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| **DIFFERENTIAL EQUATIONS** |

**UNIT – I: Differential equations of first order and first degree**

Linear-Bernoulli-Exact-Reducible to exact.

Applications: Newton’s Law of cooling-Law of natural growth and decay- Orthogonal trajectories.

**UNIT – II: Linear differential equations of higher order**

Non-homogeneous equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, eaxV(x), xV(x). Method of Variation of parameters for solving second order linear differential equations

Applications: LCR circuit, Simple Harmonic motion

**UNIT – III: Laplace transforms**

Laplace transforms of standard functions-Shifting Theorems, Transforms of derivatives and

integrals – Unit step function –Dirac’s delta function-

**UNIT – IV: Inverse Laplace transforms**

Inverse Laplace transforms -Convolution theorem (without proof).

Application: Solutions of ordinary differential equations of using Laplace transforms.

**UNIT – V: Mean value theorems** (Without poof) **& Partial Differentiation**

Rolle’s Theorem-Lagrange’s mean value Theorem –Cauchy’s mean value theorem - Taylor series and Maclaurin’s series expansions of functions of single variable - Jacobian, Functional dependence.

**UNIT – VI: First order Partial differential equations**

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations-Solutions of Linear Partial differential equations with constant coefficients by the method of separation of Variables.

**Books:**

1. **B.S. GREWAL**, Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **B.V. RAMANA**, Higher Engineering Mathematics, Tata McGraw Hill

**Reference Book:**

1. **ERWIN KREYSZIG**, Advanced Engineering Mathematics, 9th Edition, Wiley-India