MANIPAL UNIVERSITY JAIPUR

School of Basic Sciences

Department of Mathematics & Statistics

Course Hand-out

Differential Equation-1 | **MA1204** | 4 Credits | 3 1 0 4

Session: Jan 18-June 18 | Faculty: Dr. Indeewar Kumar | B.Sc. (Hons.) Mathematics, Sem-II

COURSE OUTCOMES: At the end of the course, students will be able to

[MA1204.1] Enhance the skill to generate the differential equations.

[MA1204.2] Develop the skill to solve the first order and first-degree differential equations

[MA1204.3] An ability to solve higher order differential equations with constant coefficients which improve their analytical skills to make them employable.

[MA1204.4] An understanding for finding the solution of second ordinary differential equation with variable coefficient.

[MA1204.5] A knowledge and understanding to find the Solution of ordinary differential equations by finite difference method.

A. SYLLABUS

Ordinary differential equations: Order and degree of a differential equation; Linear and nonlinear differential equations; Formation of differential equations; General, particular and singular solution; Wronskian; Its properties and applications; Linear dependence and independence. **Equations of first order and first degree:** Variable separable method; Homogeneous equations; Equations reducible to homogeneous form; Linear equations and equations reducible to linear form; Exact equations; Integrating factor; Equations reducible to exact form; orthogonal trajectories in Cartesian coordinates; Some applications of first order equations. **Equations of first order and higher degree:** Equations solvable for x, y and p; Clairaut's and Lagrange's equation; Equations reducible to Clairaut's form; Singular solution. **Higher order linear differential equations:** Linear equations with constant coefficients; Complementary function; Particular integral of the forms e^{ax}, $\sin ax$, $\cos ax$, x^m, $e^{ax}V$, x^mV; Cauchy's homogeneous equation.

B. TEXT BOOKS

1. J. L. Bansal, S. L. Bhargava and S. M. Agarwal, Differential Equations, Jaipur Publishing House, Jaipur, 2012.
2. M. D. Raisinghania, Ordinary and Partial Differential Equations, S. Chand & Comp., New Delhi, 2013
3. S. L. Ross, Differential Equations, Wiley India, 2013.
4. E.A. Coddington, An Introduction to Ordinary Differential Equations, PHI, 2011.
5. R. K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, 4th Edition, Narosa Publishing House, 2014.
6. G. F. Simmons, Differential Equations, Tata McGraw-Hill, 2006.