OBJECTIVES:

1.Learn how differential equations appear in real life and physical phenomena.

2. Demonstrate comprehension and understanding in the topics of the course through symbolic and graphs.

3. Model real-life applications using differential equations

4. Use power series to solve differential equations

5. Use Laplace transforms and their inverses to solve differential equations

BSM 302 ORDINARY DIFFERENTIAL EQUATIONS										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs./Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
4	0	0	4	4	25	50	25	---	---	100

UNIT I **8**

Elementary Differential Equations: Definitions of order, degree, linear, nonlinear, homogeneous and non-homogeneous. Solution of first order equations – Variable Separable Form, Linear Differential Equations, Reduction to Linear Differential Equations, Exact Differential Equations, etc.

UNIT II **9**

Nth Order Ordinary Differential Equations: Complementary function and particular integral. Initial and boundary value problems. Linear differential equations with constant coefficients. Cauchy-Euler equation.

UNIT III **9**

Second order differential equations: Equations of the form y" = f(y). Simple applications. Laplace Transform. Inverse Laplace transforms. Dirac delta and unit step function. Solution of initial value problems. Application to solving ordinary differential equations.

UNIT IV **13**

Differential EquationsII: Second order linear differential equations, Change of dependent and independent variables, variation of parameters. Solution in series- Bessel and Legendre functions, Orthogonality, Generating functions and recurrence relations.

APPROXIMATE TOTAL **39 Hours**

Texts and References

1. **Simmons, G. F.,** Differential equations with applications and historical notes, 2nd Ed. Mc Graw Hill, 1991.
2. **Raisinghania, M.D.,**Ordinary and Partial Differential Equations by, 8th edition, S. Chand Publication (2010).
3. **Ross, S.L.,** Introduction to OrdinaryDifferential Equations, 4rd Ed., Wiley (1989).
4. **Euler, N.**, A First Course in Ordinary Differential Equations, Bookboon (2015).

OUTCOMES:

1. Distinguish between linear, nonlinear, partial and ordinary differential equations.
2. Formation of ordinary differential equations (ODEs).
3. Recognize and solve a variable separable differential equation, homogeneous differential equation, and to solve an exact differential equation.
4. Solve basic application problems described by first order differential equations.
5. Find power series solutions about ordinary and singular points.
6. Find the Laplace transform of a function by definition and by use of a table.
7. Find the inverse Laplace transform of a function.
8. To make mathematical models involving differential equations for problems encountered in engineering, social and physical sciences, and to solve them by using one or a combination of the methods available.