

2BS02: DIFFERENTIAL EQUATIONS AND STATISTICS

CREDITS - 4 (LTP:3,1,0)

2nd Year, B. Tech. (Civil, Mechanical, Production)

Teaching and Assessment Scheme:

Teaching Scheme (Hours per Week)			Credits	Assessment Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE	CE	ESE	CE	150	
3	1	0	4	60	40	20		30

Course Contents:

Unit No.	Topics	Teaching Hours
1	Ordinary differential equations of higher orders Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.	10
2	Partial Differential Equations First order partial differential equations, solutions of first order linear PDEs. Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method. Second-order linear equations and their classification, Initial and boundary conditions, D'Alembert's solution of the wave equation; Duhamel's principle for one dimensional wave equation. Separation of variables method to solve partial differential equations	12
3	Basic Statistics: Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.	8
4	Applied Statistics: Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.	8
5	Small samples: Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.	4
TOTAL		42

List of References:

1. Erwin Kreyszig, “*Advanced Engineering Mathematics*”, 9th Edition, John Wiley & Sons, 2006.
2. Chandrika Prasad and Reena Garg, “*Advanced Engineering Mathematics*”, Khanna Book Publishing Co. (P) Ltd., Delhi

BVM ENGINEERING COLLEGE [AN AUTONOMOUS INSTITUTION]

3. N.P. Bali and Manish Goyal, “*A text book of Engineering Mathematics*”, Laxmi Publications, Reprint, 2010.
4. B.S. Grewal, “*Higher Engineering Mathematics*”, Khanna Publishers, 35th Edition, 2000.
5. W. E. Boyce and R. C. Di Prima, “*Elementary Differential Equations and Boundary Value Problems*”, 9th Edition, Wiley India, 2009.
6. S. C. Gupta, V. K. Kapur, “*Fundamental of Statistics*”, Sultan Chand & Sons, India,
7. S. Ross, “*A first course in Probability*”, Pearson Education India, 2002.
8. Richard A. Johnson, Miller and Freund's – “*Probability and Statistics for Engineers*”, Prentice Hall of India, 2011.

Course outcome:

At the end of this course students will be able to

1. Understand effective mathematical tools for the solutions of ordinary and partial differential equations
2. Analyze and solve ordinary and partial differential equations.
3. Apply effective mathematical tools for the solutions of ordinary and partial differential equations.
4. Understand the concepts and tools of Statistics.
5. Analyze and solve various engineering problems through the tools of Statistics.
6. Adapt tools of applied statistics and sampling theory and apply them in engineering problems.