BVM ENGINEERING COLLEGE [AN AUTONOMOUS INSTITUTION]

2BS03: NUMERICAL METHODS IN CIVIL ENGINEERING
CREDITS - 2 (LTP:1,0,1)

Course Objectives:

1. Teach concepts of numerical methods.
2. Application of numerical methods in civil engineering

Teaching and Assessment Scheme:

Teaching Scheme (Hours per week)			Credits	Assessment Scheme				Total Marks
				Theory		Practical		
L	T	P	C	ESE	CE	ESE	CE	100
1	0	2	2	30	20	20	30	

Course Contents:

Unit No.	Topics	Teaching Hours
1	**Solution of a System of Linear Equations:** Gauss-Jacobi Method and Gauss-Siedel method, LU decomposition method, Cholesky's Symmetric break method.	03
2	**Roots of Algebraic and Transcendental Equations:** Bisection Method, Secant and Newton-Raphson methods.	03
3	**Numerical Integration:** Simpson's formulae, Gaussian quadrature formulae.	03
4	**Finite Differences and Interpolation:** Finite Differences, Forward, Backward and Central operators, Interpolation by polynomials: Newton's forward, Backward interpolation formulae, Newton's divided and Lagrange's formulae for unequal intervals.	03
5	**Numerical solution of Ordinary Differential Equations:** Euler method, Modified Euler method, Fourth order Runge-Kutta method	03
	Total	**15**

List of References:

1. Steven C. Chapra and Raymond P. Canale, "*Numerical Methods for Engineers*", Fifth Edition, McGraw-Hill.
2. E. Kreyszig, "*Advanced Engineering Mathematics*",8th Edition, John Wiley (1999)
3. C.E. Froberg, "*Introduction to Numerical Analysis*" , 2nd Edition, Addison-Wesley,1981
4. S. D. Conte and Carl de Boor, "*Elementary Numerical Analysis-An Algorithmic Approach*" (3rd Edition), McGraw-Hill, 1980
5. S.C. Gupta and V. K. Kapoor, "*Fundamentals of Mathematical Statistics*", 11th Edition, Sultan Chand & Sons.
6. Gerald C. F. and Wheatley P.O., "*Applied Numerical Analysis*", 5th Edition, AddisonWesley, Singapore, 1998.

Course Outcomes (COs):

1. Solve civil engineering problems using numerical methods.
2. Use computational soft tools.