

Course Number and Name												
BMA502 & Numerical methods												
Credits and Contact Hours												
4 & 75												
Course Coordinator's Name												
Dr.M.Ramya												
Text Books and References												
Text Books:												
1. Sastry.SS “Introductory Numerical Methods” PHI, 2010[Units I to III]												
2. Jain K.K. Iyengar, S.R.K and Jain, R.K. “Numerical Methods for Scientific and Engineering Computation” 3 rd edition, New Age International Publications and Co. 1993.[Units IV & V]												
References:												
1. Grewal, B.S. “Higher Engineering Mathematics (36 th edition)” Khanna Publication Delhi 2001.												
2. Curtis F.Gerald. “Applied Numerical Analysis” 7 th Edn. Pearson Education, Chennai-600113. 2007												
3 Dennis G.Zill and Warren S.Wright. “Advanced Engineering Mathematics”. 3 rd Edn. Jones & Bartlett Publishers, UK. 1992.												
Course Description												
To train the students with Mathematical techniques to solve problems in Engineering with numerical data.												
Prerequisites						Co-requisites						
Mathematics-I						Nil						
required, elective, or selected elective (as per Table 5-1)												
Required												
Course Outcomes (COs)												
CO1: Solve a single equation and a system of linear equations by different methods and get exact Solution and iterative solution.												
CO2: Interpolate a dependent variable based on a given set of values by a suitable method.												
CO3: Find integral value and differential coefficient based on a given set of values.												
CO4: Solve initial value problem of ODE and boundary value problems of PDE.												
Student Outcomes (SOs) from Criterion 3 covered by this Course												
COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H	H	L	L	H	M	M	M	L	L	L	L
CO2	H	H			H	M	M	M		L		
CO3	H	H			H	M	M	M			L	L
CO4	H	H	L	L	H	M	M	M	L	L	L	L
List of Topics Covered												

UNIT-1 SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS 9+6

Iterative method, Newton–Raphson methods for single variable- Solutions of linear system by Gaussian, Gauss-Jordan, Jacobian and Gauss-Siedel methods, Inverse of Matrix by Gauss Jordan method, Eigen value of a Matrix power and Jacobian methods.

UNIT-II INTERPOLATION (FINITE DIFFERENCES) 9+6

Newton's Divided Difference Formula, Lagrange's Interpolation-Forward and Backward Difference Formula-Sterling's and Bessel's Central Difference Formula.

UNIT-III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+6

Numerical Differentiation with interpolation polynomials, Numerical Integration by Trapezoidal Simpson's(both 1/3 and 3/8)rule, Double integrals using Trapezoidal and Simpson's rule.

UNIT-IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9+6

Single Step methods, Taylors Series, Euler and Modified Euler, Runge-Kutta methods of first and second order Differential equations, Multi Step methods, Milne and Adam's-Bashforth predictor and corrector method.

UNIT-V BOUNDARY VALUE PROBLEMS FOR ODE AND PDE 9+6

Finite difference for the second order Ordinary Differential Equations, Finite Difference solutions for one dimensional heat equations(both Implicit and Explicit), One Dimensional wave equation, Two Dimensional, Laplace and Poisson Equation.