MA 2264 -NUMERICAL METHODS **L T P C 3 1 0 4**

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9

Solution of equation - Fixed point iteration: x=g(x) method – Newton's method – Solution of linear system by Gaussian elimination and Gauss-Jordon methods - Iterative methods - Gauss-Seidel methods - Inverse of a matrix by Gauss Jordon method – Eigen value of a matrix by power method and by Jacobi method for symmetric matrix.

UNIT II INTERPOLATION AND APPROXIMATION 9

Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline – Newton's forward and backward difference formulas.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9

Differentiation using interpolation formulae –Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules – Romberg's method – Two and Three point Gaussian quadrature formulas – Double integrals using trapezoidal and Simpsons's rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9

Single step methods: Taylor series method – Euler methods for First order Runge – Kutta method for solving first and second order equations – Multistep methods: Milne's and Adam's predictor and corrector methods.

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9

Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

L = 45 T = 15 TOTAL = 60 PERIODS

TEXT BOOKS

1. VEERARJAN, T and RAMACHANDRAN.T, 'NUMERICAL METHODS with programming in 'C' Second Edition Tata McGraw Hill Pub.Co.Ltd, First reprint 2007.
2. SANKAR RAO K' NUMERICAL METHODS FOR SCIENTISTS AND ENGINEERS –3rd Edition Princtice Hall of India Private, New Delhi, 2007.

REFERENCES

1. P. Kandasamy, K. Thilagavathy and K. Gunavathy, 'Numerical Methods', S.Chand Co. Ltd., New Delhi, 2003.
2. GERALD C.F. and WHEATE, P.O. 'APPLIED NUMERICAL ANALYSIS'… Edition, Pearson Education Asia, New Delhi.

MICRO LESSON PLAN

HOURS	TOPICS TO BE COVERED	REF. / TEXT BOOK
	UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS	
1 - 3	Solution of equation - Fixed point iteration: x=g(x) method	R 1
4	Newton's method	
5 – 6	Solution of linear system by Gaussian elimination and Gauss-Jordon methods	
7	Iterative methods - Gauss-Seidel methods	
8	Inverse of a matrix by Gauss Jordon method	
9	Eigen value of a matrix by power method and by Jacobi method for symmetric matrix	
10 – 12	**TUTORIAL**	
	UNIT II INTERPOLATION AND APPROXIMATION	
13 – 14	Lagrangian Polynomials	R 1
15	Divided differences	
16 – 17	Interpolating with a cubic spline	
18 – 21	Newton's forward and backward difference formulas	
22 – 24	**TUTORIAL**	
	UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION	
25 – 26	Differentiation using interpolation formulae	R 1
27 – 29	Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules	
30	Romberg's method	
31	Two and Three point Gaussian quadrature formulas	
32 – 33	Double integrals using trapezoidal and Simpsons's rules	
34 – 36	**TUTORIAL**	
	UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS	
37 – 39	Single step methods: Taylor series method	R 1
40 – 42	Euler methods for First order Runge – Kutta method for solving first and second order equations	
43 – 45	Multistep methods: Milne's and Adam's predictor and corrector methods.	
46 – 48	**TUTORIAL**	
	UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS	
49 – 50	Finite difference solution of second order ordinary differential equation	R 1
51 – 52	Finite difference solution of one dimensional heat equation by explicit and implicit methods	
53 – 54	One dimensional wave equation	
55 – 57	two dimensional Laplace and Poisson equations	
58 – 60	**TUTORIAL**	

Prepared by,

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