SREE VIDYANIKETHAN ENGINEERING COLLEGE (Autonomous)

SREE SAINATH NAGAR, A. RANGAMPET – 517 102

LESSON PLAN

Name of the Subject : Matrices and Numerical Methods

Class & Semester : I B.Tech - I Semester

S. No.	Topic	No. of periods	Book(s) followed	Topics for self-study
UNIT – I:MATRIX THEORY				
1.	Rank of a matrix, Echelon form	2	T1	(a)Solutions of non-homogeneous equations by direct methods (b) reduction of QF into normal form by Lagrange's method
2.	Normal form of a matrix	1	T1	
3.	**Tutorial**	**1**		
4.	Inverse of a matrix by elementary row operations.	1	T1	
5.	Solutions of linear system of equations.	2	T1	
6.	**Tutorial**	**1**		
7.	Eigen values, Eigen vectors and properties (without proofs).	1	T1	
8.	Diagonalization. Quadratic form	2	T1	
9.	Reductions to canonical form using orthogonal transformation method	1	T1	
10.	Nature of QF.	1	T1	
Total periods required:		**13**		
UNIT – II: NUMERICAL SOLUTIONS OF EQUATIONS AND CURVE FITTING				
11.	Solutions by **bisection method**	1	T1	(a) solutions of algebraic and transcendental equations by iteration method, Regula falsi method. (b) fitting of power curves to the given data (c) curve fitting by sum of exponentials
12.	Regula-falsi method	1	T1	
13.	**Tutorial**	**1**		
14.	Solutions by Newton – Raphson's method.	1	T1	
15.	Curve fitting by the principle of least squares, fitting of a straight line	1	T1	
16.	Fitting of a parabola.	1	T1	
17.	**Tutorial**	**1**		
18.	Fitting of exponential curves	3	T1	
Total periods required:		**10**		
UNIT -III: INTERPOLATION				
19.	Interpolation, difference operators and their relationships	2	T1	(a)Interpolation by Gauss forward, Gauss backward, sterling's, Bessel's and Everett's formulae (b) interpolation by Newton's divided
20.	**Tutorial**	**1**		
21.	Newton's forward formula	2	T1	
22.	**Tutorial**	**1**		
23.	Newton's backward formula	2	T1	
24.	Lagrange's interpolation formula.	1	T1	

S. No.	Topic	No. of periods	Book(s) followed	Topics for self-study
				difference formula
25.	Partial fractions by Lagrange's interpolation formula.	1	T1	
Total periods required:		**10**		
UNIT – IV: NUMERICAL DIFFERENTIATION AND INTEGRATION				
26.	Numerical differentiation using **Newton's forward formula**	2	T1	(a)Numerical differentiation by Gauss forward, Gauss backward, sterling's (b) Numerical integration by Booles rule, Weddels rule.
27.	**Tutorial**	**1**		
28.	Numerical differentiation using **Newton's backward formula.**	2	T1	
29.	Numerical integration using **Trapezoidal rule**	1	T1	
30.	Numerical integration using **Simpsons 1/3rd rule**	1	T1	
31.	**Tutorial**	**1**		
32.	Numerical integration using **Simpsons 3/8th rule**	1	T1	
Total periods required:		**10**		
UNIT – V: SOLUTIONS OF ORDINARTY DIFFERENTIAL EQUATIONS				
33.	Numerical solutions of first order Initial value problems using **Taylor series method**	2	T1	a) Numerical solutions of differential equations by Picard's method of successive approximation, Adam-Boshforth predictor corrector methods
34.	Numerical solutions of first order Initial value problems using **Euler's method**	1	T1	
35.	**Tutorial**	1		
36.	Numerical solutions of first order Initial value problems using **modified Euler's, method**	2	T1	
37.	Numerical solutions of first order Initial value problems using **Runge – Kutta method (4 thorder only)**	2	T1	
38.	**Tutorial**	**1**		
39.	Numerical solutions of first order Initial value problems using **Milnes predictor – corrector method**	3	T1	
Total periods required:		**12**		
Grand total periods required:		**55**		

TEXTBOOK:

T1. K.V. Iyenger, B. Krishna Gandhi, S.Ranganadham and M.V.S.S.N.Prasad, *Mathematical Methods,*S.Chand and Company, 8/e,2013

REFERENCEBOOKS:

R1. B.S. Grewal, *Higher engineering mathematics*, Khanna Publishers, 42th Edition.2012

R2. S.S.Sastry,*Introductorymethodsof Numerical Analysis*, Prentice Hall of India,5/e,2013