LESSON PLAN

Name of the Subject: MATHEMATICAL METHODS (14BT1BS04)
Class & Semester: I B.Tech year wise all branches except CE and ME

S. No.	Topic	No. of periods	Book(s) followed	Topics for self study
UNIT – I: MATRIX THEORY AND APPLICATIONS				
1	Rank of a matrix - Echelon form	2	T1	Solutions of non-Homogeneous equations by Cramer's rule, Matrix inversion method, Gauss elimination and Gauss siedel iteration methods.
2	Normal form of a matrix	1	T1	
3	Inverse of a matrix by normal form.	1	T1	
4	Homogenous linear system of equations	2	T1	
5	Non-homogenous system of linear equations.	2	T1	
6	Solution of equations - Gauss elimination method.	1	T1	
7	Eigen values &Eigen vectors and properties.	3	T1	
8	Cayley Hamilton Theorem – verification and applications	2	T1	
9	Inverse and powers of a matrix using Cayley Hamilton Theorem,	1	T1	
10	Diagonalization of a matrix	1	T1	
11	Quadratic forms & Nature of QF	2	T1	
12	Normal form of Q F	2	T1	
13Total periods required:		**20**		
UNIT – II: NUMERICAL SOLUTIONS, CURVE FITTING AND INTERPOLATION				
13	Numerical solutions of equations by Bisection method	2	T1	Numerical solutions of equations by iteration method Fitting power curves to the given data. Interpolation by Gauss forward, Gauss backward, Sterling's, Bessel's and Everett's Formulae, Newton's divided difference formula
14	Numerical solutions of equations by Regula-Falsi method	2	T1	
15	Numerical solutions of equations by Newton – Raphson's method	2	T1	
16	Fitting of a straight line by least square method	2	T1	
17	Fitting of a parabola by least square method	1	T1	
18	Fitting of an exponential curve by least square method	1	T1	
19	Interpolation - forward difference , backward difference & central difference operators (definitions)	1	T1	

No.	Topic	Periods	Test	Reference
20	Relationships between different types of operators	2	T1	
21	Interpolation by Newton's Forward formula	2	T1	
22	Interpolation by Newton's Backward formula,	2	T1	
23	Lagranges Interpolation formula	2	T1	
Total periods required:		**19**		
UNIT -III: NUMERICAL DIFFERENTIATION, INTEGRATION AND SOLUTIONSOFO D E				
24	Numerical differentiation using Newton's forward formula	3	T1	Numerical differentiation by Gauss forward, Gauss backward, Sterling's formulae.
25	Numerical differentiation using Newton's backward formula.	3	T1	
26	Numerical integration by Trapezoidal rule	1	T1	
27	Numerical integration by Simpsons 1/3 rule,	2	T1	
28	Numerical integration by Simpsons 3/8 rule.	2	T1	Numerical integration by Boole's and Weddel's rule.
29	Numerical solutions of ordinary differential equations using Taylor series	3	T1	
30	Numerical solutions of ordinary differential equations using Modified Euler's method	3	T1	Solutions of ODE by predictor corrector methods : Milne's method and Adam- Boshforth method
31	Numerical solutions of ordinary differential equations using Runge – Kutta method (4thorder only).	3	T1	
Total periods required:		**20**		
UNIT – IV: TRANSFORMATION TECHNIQUES				
32	Fourier series Dirichlet's conditions, Euler's formulae.	2	T1	
33	Fourier series of Even and odd functions.	2	T1	
34	Half-range Fourier sine and cosine expansions.	2	T1	
35	Fourier integral theorem (statement only), Fourier sine and cosine integrals	3	T1	
36	Fourier sine and cosine transforms, inverse transforms.	3	T1	Finite Fourier Transforms
37	Z – transforms, properties	2	T1	
38	Damping rule, shifting rule	1	T1	
39	Initial and final value theorems	2	T1	

40	Convolution theorem	2	T1	
41	Inverse Z– transforms	3	T1	
42	Solution of difference equations by Z–transforms.	3	T1	
Total periods required:		**25**		
UNIT – V: PARTIAL DIFFERENTIAL EQUATIONS				
43	Formation of Partial differential equations	3	T1	
44	Solutions of first order linear p.d.e. using Method of grouping ,Lagrange's method.	3	R1	
45	Method of separation of variables	3	T1	
46	Solutions of one dimensional Wave equation	3	T1	
47	Heat equation.	2	T1	
48	Two dimensional Laplace equation	2	T1	
Total periods required:		**16**		
Grand total periods required:		**100**		

TEXTBOOK:

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

REFERENCE BOOKS:

R1.   B.S. Grewal, Higher Engineering Mathematics, Khanna publishers, Delhi, 42/e, 2012.

R2   S.S.Sastry, Introductorymethodsof Numerical Analysis, Prentice Hall of India, 4/e,
2005.

Signature of the faculty Member   **Signature of the HOD**