SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Applied Mathematics	LP: MA22452 Rev. No: 0 Date: 31/01/2024
B.E/B.Tech: (Common to EE/CH) **Regulation:** 2022 **Sub. Code / Sub. Name** : MA22452 NUMERICAL METHODS **Unit** : I	

Unit syllabus: Solution of Equations and Eigen value problems

Solution of algebraic and transcendental equations- Newton Raphson method -Solution of linear system by Gaussian elimination method and Gauss Jordan methods - Iterative methods of Gauss-Seidel method- Inverse of a matrix by Gauss Jordan method-Eigen value of a matrix by Power method.

Objective: To know how to Solve the given algebraic or transcendental equation and linear system of equations.

Session No	Topics to be covered	Ref	Teaching Method
1	Introduction of the syllabus and Unit I	TB -1&2	BB/PPT
2	Newton Raphson method and problems	Pg 38-44	BB/PPT
3	Newton Raphson method and problems	Pg 38-44	BB/PPT
4	Solution to linear system of equation Gauss elimination method	Pg 80-82	BB/PPT
5	Gauss Jordan method	Pg 83-85	BB/PPT
6	Gauss Seidal method- problems	Pg 93-97	BB/PPT
7	Gauss Seidel method- problems	Pg 93-97	BB/PPT
8	Inverse of a matrix by Gauss Jordan method	Pg 106-108	BB/PPT
9	Eigen value problems – Power method	Pg 117-120	BB/PPT
10	Eigen value problems – Power method	Pg 117-120	BB/PPT
11	Tutorial		BB/PPT
12	Summarization of unit I		BB/PPT
Content beyond syllabus covered (if any):			

*** Session duration: 50 minutes**

Sub. Code / Sub. Name: MA22452 NUMERICAL METHODS

Unit : II

Unit syllabus: Interpolation and Approximation

Interpolation with unequal intervals-Lagrange's Interpolation-Inverse Lagrange's interpolation method – Newton's divided difference interpolation – Interpolation with equal intervals -Newton's forward and back ward difference formulae.

Objective: To Know how to interpolate or extrapolate with the data available.

Session No	Topics to be covered	Ref	Teaching Method
13	Introduction of the syllabus and Unit II	TB.1 & Ref.4	BB/PPT
14	Lagrangian polynomial method	Ref 4 Pg 110-113	BB/PPT
15	Lagrangian method	Ref 4 Pg 110-113	BB/PPT
16	Inverse interpolation using Lagrangian method	Ref 4 Pg 110-113	BB/PPT
17	Tutorial		BB/PPT
18	Divided differences method	Ref 4 Pg 113-118	BB/PPT
19	Divided differences methods and problems	Ref 4 Pg 113-118	BB/PPT
20	CAT I		
21	Newton's Forward differences method	TB 1 Pg 232-238	BB/PPT
22	Newton's backward differences method	TB 1 Pg 232-238	BB/PPT
23	Tutorial		BB/PPT
24	Summarization of the Unit II		

Content beyond syllabus covered (if any):

*** Session duration: 50 minutes**

Sub. Code / Sub. Name: MA22452 NUMERICAL METHODS

Unit : III

Unit syllabus: Numerical Differentiation and Integration.
Approximation of derivatives using interpolation polynomials– Numerical integration by Trapezoidal, Simpson's 1/3 - Two and three point Gaussian quadrature formulae – Double integrals using Trapezoidal and Simpson's 1/3rules.

Objective: To acquire the knowledge of finding numerical values of differentiations and integrations.

Session No	Topics to be covered	Ref	Teaching Method
25	Introduction of the syllabus and Unit III	TB1 & Ref. 4	BB/PPT
26	Approximation of derivation using interpolation polynomial	TB 2 Pg 212-214	BB/PPT
27	Approximation of derivation using interpolation polynomial	TB 2 Pg 212-214	BB/PPT
28	Numerical Integration by Trapezoidal rule and problems	Ref. 4 Pg 156-159	BB/PPT
29	Simpson's 1/3 rule and problems	Ref. 4 Pg 156-159	BB/PPT
30	Two and three point Gaussian quadrature formulas and problems	TB 1 Pg 265-270	BB/PPT
31	Double integration by Trapezoidal method and Problems	Ref 4 Pg 161-163	BB/PPT
32	Double integration by Trapezoidal method and Problems	Ref 4 Pg 161-163	BB/PPT
33	Double integration by Simpson's 1/3rules and Problems	Ref 4 Pg 161-163	BB/PPT
34	Double integration by Simpson's 1/3rules and Problems	Ref 4 Pg 161-163	BB/PPT
35	CAT II		
Content beyond syllabus covered (if any):			

*** Session duration: 50 minutes**

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MA22452 NUMERICAL METHODS

Unit : IV

Unit syllabus: Initial value problems for ODE.

Single step Methods – Taylor's series method- Modified Euler's Method – Fourth order Runge – Kutta method for solving first, second order and simultaneous first order equations – Multistep methods – Milne's and Adams-Bash forth Predicator and corrector methods for solving first order equations.

Objective: To know how to solve the given ODE, numerically.

Session No	Topics to be covered	Ref	Teaching Method
36	Introduction of the syllabus and Unit IV	Ref. 7	BB/PPT
37	Taylor's series method and Problems	Ref.7 Pg 352-362	BB/PPT
38	Modified Euler method and problems	Ref.7 Pg 371-376	BB/PPT
39	Modified Euler method and problems	Ref.7 Pg 371-376	BB/PPT
40	Fourth order Runge Kutta method for solving first order equations.	Ref.7 Pg 383-393	BB/PPT
41	Fourth order Runge Kutta method for solving second order equations	Ref.7 Pg 383-393	BB/PPT
42	Fourth order Runge Kutta method for solving simultaneous equations	Ref.7 Pg 383-393	BB/PPT
43	Multi step method -Miline's method and problems	Ref.7 Pg 395-404	BB/PPT
44	Multi step method -Miline's method and problems	Ref.7 Pg 395-404	BB/PPT
45	Adam's method and problems	Ref.7 Pg 404-408	BB/PPT
46	Adam's method and problems	Ref.7 Pg 404-408	BB/PPT
47	Summarization of the unit IV		
48	Tutorial		
Content beyond syllabus covered (if any):			

*** Session duration: 50 minutes**

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MA22452 NUMERICAL METHODS

Unit : V

Unit syllabus: Boundary value problems in partial differential equations.
Finite difference techniques for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain-One dimensional heat flow equation by explicit and implicit (Crank Nicholson) methods-One dimensional wave equation by explicit method.

Objective: To know how to solve the boundary value problems numerically.

Session No	Topics to be covered	Ref	Teaching Method
49	Introduction of the syllabus and Unit V	TB 1 & Ref.7	BB/PPT
50	Two dimensional Laplace equation – problems	TB 1 Pg 351-356	BB/PPT
51	Two dimensional Laplace equation – problems	TB 1 Pg 351-356	BB/PPT
52	Two dimensional Poisson equation – problems	TB 1 Pg 356-360	BB/PPT
53	Two dimensional Poisson equation – problems	TB 1 Pg 356-360	BB/PPT
54	One dimensional heat flow equation by explicit method	Ref.7 Pg 441-446	BB/PPT
55	One dimensional heat flow equation by explicit method	Ref.7 Pg 441-446	BB/PPT
56	One dimensional heat flow equation by implicit(Crank-Nicholson)method	Ref.7 Pg 446-451	BB/PPT
57	One dimensional wave equation by explicit method	Ref.7 Pg 452-459	BB/PPT
58	Tutorial		BB/PPT
59	Summarizing the unit V		
60	CAT-III		

Content beyond syllabus covered (if any):

*** Session duration: 50 minutes**

Sub. Code / Sub. Name: MA22452 NUMERICAL METHODS

TEXT BOOKS:

1. Grewal.B.S., and Grewal.J.S., Numerical methods in Engineering AND Science, Khanna Publishers,9th Edition, New Delhi,2007
2. Iyenger.S.R.K. and Jain.R.K, Numerical methods, New Age International Publishers, New Delhi, 2012.
3. William Embleton OBE and Leslie Jackson, Reed's Mathematics for Engineers, Adlard Coles Nautical, London, 2011.(for Marine Engineers)

REFERENCES:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 7thEdition, Wiley, India, 2007.
2. Chapra. S.C., and Canale.R.P., Numerical methods for Engineers, Tata McGraw Hill,5th Edition , New Delhi, 2007.
3. Brian Braide. A friendly introduction to Numerical Analysis, Pearson Education, Asia, New Delhi, 2007.
4. Sankara Rao. K. Numerical methods for Scientists and Engineers, Prentice Hall of India Private, 3rd edition, New Delhi, 2007.
5. Gerald. C.F., and Wheatley. P.O., Applied Numerical analysis, Pearson education, Asia, 6th edition, New Delhi, 2006.
6. Venkataraman. M.K., Numerical methods in Science and Engineering, National Publishers, 1995.
7. Kandasamy. K., Thilagavathy. K., and Gunavathy. K., Numerical Methods, S. Chand & Company Ltd., New Delhi, 2008.

	Prepared by	Approved by
Signature	31/01/24	21/1/2024
Name	Dr.R.SURESH	Dr.R.MUTHUCUMARASWAMY
Designation	ASSISTANT PROFESSOR	HOD AND DEAN
Date	31/01/2024	31/01/2024
Remarks *:		