Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

Structural Engineering

Analytical and Numerical Methods for Structural Engineering

(GR20D5006)

I M.Tech - I Semester

(2021-2022)

V Naresh Kumar Varma

Assistant Professor

GokarajuRangaraju Institute of Engineering and Technology
Department of Civil Engineering

Design of Concrete Structures - I

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SYLLABUS

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject :ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

Unit-I

Fundamentals of Numerical Methods: Error Analysis, Floating-Point Approximation of a Number; Loss of Significance and Error Propagation; Stability in Numerical Computation. **Curve Fitting:** Linear Interpolation - Higher Order Interpolation - Lagrange Interpolation Interpolating polynomials using finites differences- Hermite Interpolation -piece-wise and spline Interpolation.

Unit-II

Elements of Matrix Algebra: Solution of Systems of Linear Equations-Direct method – Cramer's rule, Guass – Elimination Method-Gauss Jordan elimination – Triangulation (LU Decomposition) method – Iterative methods -Jacobi – Iteration method – Gauss – Siedel iteration, Eigen Value Problems- Jacobi method for symmetric matrices- Power method

Unit-III

Solution of Nonlinear Algebraic and Transcendental Equations

Bisection Method; Fixed-Point Iteration Method; Secant Method; Newton Method; Rate of Convergences; Solution of a System of Nonlinear Equations; Unconstrained Optimization.

Unit-IV

Numerical Differentiation & Integration: Solution of Ordinary and Partial Differential Equations - Numerical Integration – Double integration using Trapezoidal and Simpson's method. Euler's method – Backward Euler method – Midpoint method – single step method-Taylor's series method- R-K Methods.

Unit-V

Finite Difference scheme: Implicit & Explicit scheme

Computer Algorithms: Numerical Solutions for Different Structural Problems, Fuzzy Logic and Neural Network.

Text Books:

1. An Introduction to Numerical Analysis, Atkinson K.E., J. Wiley and Sons, 1989.
2. Theory and Problems of Numerical Analysis, Scheid F, McGraw Hill Book Company, (Shaum Series), 1988.

Reference Books:

1. Introductory Methods of Numerical Analysis, Sastry S. S, Prentice Hall of India, 1998.
2. Computer Based Numerical Analysis, Dr. M. Shanta Kumar, Khanna Book Publishers, New Delhi.
3. Numerical Methods for Scientific and Engineering Computations, M.K. Jain and S.R.K.Iyengar, New Age International Pvt. Ltd., 2005.

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Department of Civil Engineering

TIME TABLE

COURSE: Analytical and Numerical Methods in Structural Engineering

I YEAR I SEM **w.e.f: 15-11-2021**

IM.TECH(GR20) – I SEMESTER **AY: 2021-22.**

Day/Hour	9.00 – 10.00	10.00 – 11.00	11.00 – 12.00	12.00-01.00	01.00 – 02.00	02.00 – 03.00	03.00 – 04.00
MON				**LUNCH BREAK**			
TUE		ANMSE					
WED	ANMSE						
THU					ANMSE	ANMSE	
FRI							
SAT							

Signature of HOD

Date:

Signature of faculty

Date:

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Programme Educational Objectives (PEO's)

1. Graduates of the program will equip with professional expertise on the theories, process, methods and techniques for building high- quality structures in a cost-effective manner.
2. Graduatesoftheprogramwillbeabletodesignstructuralcomponentsusingcontemporysoftwaresandprofessionaltoolswithquality practices of internationalstandards.
3. Graduates of the program will be effective as both an individual contributor and a member of a development team with professional, ethical and social responsibilities.
4. Graduates of the program will grow professionally through continuing education, training, research, and adapting to the rapidly changing technological trends globally in structuralengineering.

Program Outcomes (PO's)

Graduates of the Civil Engineering programme will be able to

a. An ability to independently carry out research /investigation and development work to solve practical problems.
b. An ability to write and present a substantial technical report/document..
c. Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
d. Assess the impact of professional engineering solutions in an environmental context along with societal, health, safety, legal, ethical and cultural issues and the need for sustainable development.
e. Possess critical thinking skills and solve core, complex and multidisciplinary structural engineering problems.
f. Recognize the need for life-long learning to improve knowledge and competence.

Signature of HOD Signature of faculty

Date: Date:

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COURSE OBJECTIVES

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject :ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

On completion of this Subject/Course the student shall be able to:

S.No	Objectives
1	To analyse the performance of various interpolation technique and perform error analysis.
2	To develop the skill of solving linear algebraic systems by direct and iteration methods.
3	To compare various numerical differentiation and integration techniques.
4	To explain the various techniques to study Initial value problems in Ordinary Differential Equations.
5	To solve a range of problems on applicable software.

Signature of HOD Signature of faculty

Date: Date:

Note: Please refer to Bloom's Taxonomy, to know the illustrative verbs that can be used to state the objectives.

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COURSE OUTCOMES

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

On completion of this Subject/Course the student shall be able to:

S.No	Outcomes
1	To analyse the performance of various interpolation technique and perform error analysis.
2	Solve linear algebraic system by direct and iteration methods and apply the knowledge of Eigen values and Eigen vectors to some contents in engineering.
3	Apply the knowledge of interpolation and extrapolation of uniform and non-uniform data to certain contents of Civil Engineering.
4	Apply the knowledge of numerical differentiation and integration to some contents of Civil Engineering
5	Solve ordinary and partial differential equations in structural mechanics using numerical methods.

Signature of HOD Signature of faculty

Date: Date:

Note: Please refer to Bloom's Taxonomy, to know the illustrative verbs that can be used to state the objectives.

GokarajuRangaraju Institute of Engineering & Technology
M.Tech - Structural Engineering
Academic Year: 2021- 2022
ROLLLIST

S.No	Reg. No	Name
1	21241D2001	ATKAPURAM PRASHANTH
2	21241D2002	BANDI SRI RAM GOPAL
3	21241D2003	CHALLA MADHAVI
4	21241D2004	PAMMI DIVYA
5	21241D2005	DUMMA UMESH KUMAR
6	21241D2006	K LATHASREE
7	21241D2007	MARIYALA VAISHNAVI
8	21241D2008	MAVOORI PRANAV
9	21241D2009	MITTAPALLI NAGA ASHWINI
10	21241D2010	RAVULA VENKATA SURAJ REDDY
11	21241D2011	REPATI MOHAN BABU
12	21241D2012	CHERUKU SANDHYA
13	21241D2013	SHAIK FEROZ
14	21241D2014	S K SAI CHANDRA
15	21241D2015	THOTA HARSHAVARDHAN
16	21241D2016	VARIKUPPULA LALITHA
17	21241D2017	YAMBA RAMA GNANENDRA SAI
18	21241D2018	YENUMALA DEVESH GOUD
19	21241D2019	S PRASHANTH KUMAR
20	21241D2020	BAVANDLAPELLI THARUN TEJA
21	21241D2021	G NITISH KUMAR

Signature of HOD

Date:

Signature of faculty

Date:

GokarajuRangaraju Institute of Engineering and Technology

(Autonomous)

Structural Engineering

GUIDELINES TO STUDY THE COURSE/SUBJECT

Academic Year : 2021-22

Name of the Program: M.Tech Year: I Semester: I

Course :ANMSE Course Code: GR20D2006

Name of the faculty : V Naresh Kumar Varma Dept.: Civil Engineering

Designation : Assistant Professor

Guidelines to study the course Computer-Oriented Numerical Methods in Engineering

This course is a study of mathematical techniques used to model engineering systems. It involves the development of mathematical models and the application of the computer to solve engineering problems using the following computational techniques: Taylor Series approximation, numerical differentiation, root-finding using bracketing and open methods, linear and polynomial curve fitting, solution methods for matrix equations, numerical integration, and the solution of differential equations.

Students should have the following prerequisites

1. Fundamentals of Matrices
2. Basics of Interpolation
3. Basics of Differentiation and
4. Basics of Integration

Where will this subject help?

1. To develop the skill of solving linear algebraic systems by direct and iteration methods.

2. To illustrate advanced matrix techniques in the determination of Eigen values and Eigen vectors of square matrix.
3. To analyze the performance of various interpolation technique and perform error analysis.
4. To compare various numerical differentiation and integration techniques.
5. To explain the various techniques to study Initial and Boundary value problems in ODE.
6. To solve a range of problems on applicable software.
7. To develop the skill of solving linear algebraic systems by direct and iteration methods.

Books/Material

S.No.	Text Books
1	M.K.Jain-S.R.K.Iyengar, R.K.Jain Numerical methods for scientific and engineering computations, Willey Eastern Limited, 1987
2	S.S.Sastry, Numerical methods.
3	Curtis I.Gerala, Applied numerical analysis, AddissonWasley published campus.

S.No.	Suggested / Reference Books
1	C.Chopra, Raymond P.Canal, Numerical methods for Engineers Stevan, Mc. Graw Hill book Company, 4th edition, 2002.
2	C.Xavier, C Language and Numerical methods, New age international publisher, 2003.
3	Dr. M.Shanta Kumar, Computer based numerical analysis, Khanna Book publishers, New Delhi.

Course Design and Delivery System

1. The course syllabus is written into number of learning objectives and learning outcomes.
2. These learning objectives and outcomes will be achieved through lectures, assessments, assignments, experiments in the laboratory, projects, seminars and presentations, etc.,
3. Every student will be given an assessment plan, criteria for assessment, scheme of evaluation and grading method.
4. The learning process will be carried out through assessment of knowledge, skills and attitude by various methods and the student will be given guidance to refer to the textbooks, reference books, journals etc.,

The faculty be able to -

- Understand the principles of learning
- Understand the psychology of students
- Develop instructional objectives for a given topic
- Prepare course, lesson and unit plan
- Understand different methods of teaching and learning
- Use appropriate teaching and learning aids
- Plan and deliver lectures effectively
- Provide feedback system to students using various methods of assessments and tools of Evaluation
- Act as a guide, advisor, counselor, facilitator, motivator and not just as a teacher alone.

Signature of HOD

Date:

Signature of Faculty

Date:

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COURSE SCHEDULE

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

The Schedule for the whole Course / Subject is:

S. No.	Description	Duration (Date)		Total No. of Periods
		From	To	
1.	**UNIT-1** Fundamentals of Numerical Methods Curve Fitting	17/11/21	10/12/21	14
2.	**UNIT-II** Elements of Matrix Algebra	14/12/21	31/12/21	13
3.	**UNIT-III** Solution of Nonlinear Algebraic and Transcendental Equations	31/12/21	28/01/22	8
4.	**UNIT-IV** Numerical Differentiation & Integration	01/02/22	25/02/22	12
5.	**UNIT-V** Finite Difference schemes Computer Algorithms	16/11/21	08/12/21	9

Total No. of Instructional periods available for the course: 56 Hours / Periods

Signature of H.O.D

Date :

Signature of faculty

Date:

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SCHEDULE OF INSTRUCTIONS
COURSE PLAN

Academic Year : 2021-22
Name of the Program : M.Tech **Year:** I Year **Semester:** I
Course/Subject : ANMSE **Course Code** : GR20D2006
Name of the Faculty : V Naresh Kumar Varma
Dept.: Structural Engineering (Civil Engineering)

S. No.	Unit No	Date	Topics	Objectives & Outcomes Nos.	References(Text book, Journal…)
1	Unit I	17-11-2021	Introduction to ANMSE	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
2	Unit I	19-11-2021	Error Analysis	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
3	Unit I	19-11-2021	Floating-Point Approximation of a Number	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
4	Unit I	23-11-2021	Loss of Significance and Error Propagation	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
5	Unit I	24-11-2021	Stability in Numerical Computation	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
6	Unit I	26-11-2021	Introduction to Interpolation	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
7	Unit I	26-11-2021	Linear & Higher Order Interpolation	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
8	Unit I	30-11-2021	Higher order Interpolation	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
9	Unit	01-12-2021	Lagrange Interpolation	Cob1, CO1	Numerical methods for

	I				scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
10	Unit I	03-12-2021	Hermite Interpolation	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
11	Unit I	03-12-2021	Piecewise and Spline Interpolation	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
12	Unit I	07-12-2021	Interpolating polynomials using finite differences	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
13	Unit I	08-12-2021	Newtons Divided Difference Interpolation	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
14	Unit I	10-12-2021	Richardson’s extrapolation	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
15	Unit I	10-12-2021	Unit-I Problems	Cob1, CO1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
16	Unit II	14-12-2021	Solutions of Linear Equations - Direct Method	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
17	Unit II	15-12-2021	Cramer's Rule	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
18	Unit II	17-12-2021	Gauss - Elimination Method	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
19	Unit II	17-12-2021	Gauss - Jordan Elimination	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
20	Unit II	21-12-2021	LU Decomposition Method	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
21	Unit II	22-12-2021	Iterative Methods - Jacobi Iteration method	Cob2, CO2	Numerical methods for scientific &Engg.

					computations by M. K. Jain & S.R.K Iyengar
22	Unit II	24-12-2021	Gauss - Siedel Iteration	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
23	Unit II	24-12-2021	Introduction to Eigen Values & Eigen Vectors	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
24	Unit II	28-12-2021	Jacobi method for symmetric matrices	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
25	Unit II	29-12-2021	Power Method, Inverse Power Method	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
26	Unit II	31-12-2021	Nearest Eigen Value by Power Method	Cob2, CO2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
27	Unit III	31-12-2021	Solution of Nonlinear Algebraic and Transcendental Equations	Cob3, CO3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
28	Unit III	04-01-2022	Bisection Method	Cob3, CO3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
29	Unit III	05-01-2022	Fixed-Point Iteration Method	Cob3, CO3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
30	Unit III	07-01-2022	Secant Method	Cob3, CO3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
31	Unit III	07-01-2022	Newton Method	Cob3, CO3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
32	Unit III	25-01-2022	Regula Falsi Methods	Cob3, CO3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
33	Unit III	28-01-2022	Rate of Convergences	Cob3, CO3	Numerical methods for scientific &Engg. computations by M. K.

					Jain & S.R.K Iyengar
34	Unit III	28-01-2022	Unconstrained Optimization	Cob3, CO3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
35	Unit IV	01-02-2022	Numerical Solution of Ordinary differential equations	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
36	Unit IV	02-02-2022	Numerical Integration	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
37	Unit IV	04-02-2022	Double integration using Trapezoidal method.	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
38	Unit IV	04-02-2022	Double integration using Simpson's method.	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
39	Unit IV	08-02-2022	Integration Methods Problem Solving	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
40	Unit IV	09-02-2022	Numerical Solution of Partial differential equations	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
41	Unit IV	11-02-2022	Euler's method – Backward Euler method	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
42	Unit IV	11-02-2022	Midpoint method – single step method	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
43	Unit IV	15-02-2022	Euler's Method Problem Solving	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
44	Unit IV	16-02-2022	Taylor's series method	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
45	Unit IV	18-02-2022	Taylor's series method	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar

46	Unit IV	18-02-2022	R-K Methods	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
47	Unit IV	22-02-2022	R-K Methods	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
48	Unit IV	23-02-2022	Boundary value problems by finite difference method	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
49	Unit IV	25-02-2022	Boundary value problems	Cob4, CO4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
50	Unit V	25-02-2022	Finite Difference schemes	Cob5, CO5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
51	Unit V	02-03-2022	Implicitscheme	Cob5, CO5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
52	Unit V	04-03-2022	Explicit scheme	Cob5, CO5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
53	Unit V	04-03-2022	Computer Algorithms	Cob5, CO5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
54	Unit V	08-03-2022	Numerical Solutions for Different Structural Problems	Cob5, CO5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
55	Unit V	09-03-2022	Fuzzy Logic Neural Network.	Cob5, CO5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar
56	Unit V	11-03-2022	Neural Network	Cob5, CO5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar

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SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic Year : 2021-22
Name of the Program : M.Tech **Year:** I Year **Semester:** I

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

Unit No. 1

Topics/Sub Topics	Date	No. of Periods	Objectives & Outcomes No.	References (Text book, Journal…)	Blooms Taxonomy level
Introduction to ANMSE	17-11-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Error Analysis	19-11-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Floating-Point Approximation of a Number	19-11-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Loss of Significance and Error Propagation	23-11-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Stability in Numerical Computation	24-11-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Introduction to Interpolation	26-11-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2

Linear & Higher Order Interpolation	26-11-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Higher order Interpolation	30-11-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Lagrange Interpolation	01-12-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Hermite Interpolation	03-12-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Piecewise and Spline Interpolation	03-12-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Interpolating polynomials using finite differences	07-12-2021	1	COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Newtons Divided Difference Interpolation	08-12-2021		COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Richardson's extrapolation	10-12-2021		COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Unit-I Problems	10-12-2021		COb-1& CO-1	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3

Signature of HOD

Date:

Signature of faculty

Date:

GokarajuRangaraju Institute of Engineering and Technology
(Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

Unit No. 2

Topics/Sub Topics	Date	No. of Periods	Objectives & Outcomes No.	References (Text book, Journal…)	Blooms Taxonomy level
Solutions of Linear Equations - Direct Method	14-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Cramer's Rule	15-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Gauss - Elimination Method	17-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Gauss - Jordan Elimination	17-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2

LU Decomposition Method	21-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Iterative Methods - Jacobi Iteration method	22-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Gauss - Siedel Iteration	24-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Introduction to Eigen Values & Eigen Vectors	24-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Jacobi method for symmetric matrices	28-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Power Method, Inverse Power Method	29-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Nearest Eigen Value by Power Method	31-12-2021	1	COb-2& CO-2	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3

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GokarajuRangaraju Institute of Engineering and Technology (Autonomous)

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SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

Unit No. 3

Topics/Sub Topics	Date	No. of Periods	Objectives & Outcomes No.	References (Text book, Journal…)	Blooms Taxonomy level
Solution of Nonlinear Algebraic and Transcendental Equations	31-12-2021	1	COb-3& CO-3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Bisection Method	04-01-2022	1	COb-3& CO-3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Fixed-Point Iteration Method	05-01-2022	1	COb-3& CO-3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Secant Method	07-01-2022	1	COb-3& CO-3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2

Newton Method	07-01-2022	1	COb-3& CO-3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Regula Falsi Methods	25-01-2022	1	COb-3& CO-3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Rate of Convergences	28-01-2022	1	COb-3& CO-3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Unconstrained Optimization	28-01-2022	1	COb-3& CO-3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K4
Numerical Solution of Ordinary differential equations	01-02-2022	1	COb-3& CO-3	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3

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Date:

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SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

Unit No. 4

Topics/Sub Topics	Date	No. of Periods	Objectives & Outcomes No.	References (Text book, Journal…)	Blooms Taxonomy level
Numerical Integration	02-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Double integration using Trapezoidal method.	04-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Double integration using Simpson's method.	04-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K1
Integration Methods Problem Solving	08-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Numerical Solution of Partial differential equations	09-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2

Euler's method – Backward Euler method	11-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Midpoint method – single step method	11-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Euler's Method Problem Solving	15-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Taylor's series method	16-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Taylor's series method	18-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
R-K Methods	18-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
R-K Methods	22-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Boundary value problems by finite difference method	23-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K4
Boundary value problems	25-02-2022	1	COb-4 & CO-4	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K4

Signature of HOD

Date:

Signature of faculty

Date:

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SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

Unit No. 5

Topics/Sub Topics	Date	No. of Periods	Objectives & Outcomes No.	References (Text book, Journal…)	Blooms Taxonomy level
Finite Difference schemes	25-02-2022	1	COb-5& CO-5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Implicitscheme	02-03-2022	1	COb-5& CO-5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Explicit scheme	04-03-2022	1	COb-5& CO-5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Computer Algorithms	04-03-2022	1	COb-5& CO-5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2

Numerical Solutions for Different Structural Problems	08-03-2022	1	COb-5& CO-5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K3
Fuzzy Logic Neural Network.	09-03-2022	1	COb-5& CO-5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2
Neural Network	11-03-2022	1	COb-5& CO-5	Numerical methods for scientific &Engg. computations by M. K. Jain & S.R.K Iyengar	K2

Signature of HOD

Date:

Signature of faculty

Date:

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 11/17/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:1 **Duration of Lesson:**1 hr

Lesson Title: Introduction to ANMSE

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Introduction, Basic, Prerequisites, Mathematics

Assignment / Questions:

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 11/19/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:2 **Duration of Lesson:**1 hr

Lesson Title: Error Analysis

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Error Analysis, decimal point

Assignment / Questions:

1.Represent 625.12546 in normalized floating-point representation

Signature of faculty

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Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 11/19/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:3 **Duration of Lesson:**1 hr

Lesson Title: Floating-Point Approximation of a Number

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Floating-Point Approximation of a Number, roundoff & Cutoff

Assignment / Questions:

1. Write about floating point form of anumber

Signature of faculty

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Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 11/23/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:4 **Duration of Lesson:**1 hr

Lesson Title: Loss of Significance and Error Propagation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Loss of Significance and Error Propagation

Assignment / Questions:

1. Explain about Error Prapagation

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Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 11/24/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:5 **Duration of Lesson:**1 hr

Lesson Title: Stability in Numerical Computation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Stability in Numerical Computation, Max Error

Assignment / Questions:

1. Write about stability of a number

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Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 11/26/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:6 **Duration of Lesson:**1 hr

Lesson Title: Introduction to Interpolation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Introduction to Interpolation, Joining a curve

Assignment / Questions:

1. problems on interpolation

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 11/26/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:7 **Duration of Lesson:**1 hr

Lesson Title: Linear & Higher Order Interpolation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Linear & Higher Order Interpolation and errors

Assignment / Questions:

1. problems on higher order interpolation

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 11/30/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:8 **Duration of Lesson:**1 hr

Lesson Title: Higher order Interpolation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Higher order Interpolation and errors

Assignment / Questions:

1. problems on interpolation

Signature of faculty

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Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/1/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:9 **Duration of Lesson:**1 hr

Lesson Title: Lagrange Interpolation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Lagrange Interpolation and errors

Assignment / Questions:

1. problems on lagrange interpolation

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/3/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:10 **Duration of Lesson:**1 hr

Lesson Title: Hermite Interpolation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Hermite Interpolation and errors

Assignment / Questions:

1. problems on hermite interpolation

Signature of faculty

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Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/3/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:11 **Duration of Lesson:**1 hr

Lesson Title: Piecewise and Spline Interpolation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Piecewise and Spline Interpolation and errors

Assignment / Questions:

1. problems on spline interpolation

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/7/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:12 **Duration of Lesson:**1 hr

Lesson Title: Interpolating polynomials using finite differences

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Interpolating polynomials using finite differences and errors

Assignment / Questions:

1. problems using finite differences

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/8/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:13 **Duration of Lesson:**1 hr

Lesson Title: Newtons Divided Difference Interpolation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Newtons Divided Difference Interpolation and errors

Assignment / Questions:

1. problems on finite difference interpolation

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/10/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:14 **Duration of Lesson:**1 hr

Lesson Title: Richardson's extrapolation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Richardson's extrapolation and errors

Assignment / Questions:

1. Write about richardson's extrapolation

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/10/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:15 **Duration of Lesson:**1 hr

Lesson Title: Unit-I Problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

All interpolation methods and Doubts clearing

Assignment / Questions:

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/14/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:16 **Duration of Lesson:**1 hr

Lesson Title: Solutions of Linear Equations - Direct Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Solutions of Linear Equations - Direct Method

Assignment / Questions:

1. problems od linear equations - direct method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/15/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:17 **Duration of Lesson:**1 hr

Lesson Title: Cramer's Rule

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Cramer's Rule, No of Unknowns, determinants

Assignment / Questions:

1. problems on cramer's rule

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/17/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:18 **Duration of Lesson:**1 hr

Lesson Title: Gauss - Elimination Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Gauss - Elimination Method, LDU--> U

Assignment / Questions:

1. problems on elimination method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/17/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:19 **Duration of Lesson:**1 hr

Lesson Title: Gauss - Jordan Elimination

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Gauss - Jordan Elimination, LDU--> D

Assignment / Questions:

1. problems on jordan elimination

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/21/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:20 **Duration of Lesson:**1 hr

Lesson Title:LU Decomposition Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

LU Decomposition Method

Assignment / Questions:

1. problems on lu decomposition method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/22/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:21 **Duration of Lesson:**1 hr

Lesson Title: Iterative Methods - Jacobi Iteration method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Iterative Methods - Jacobi Iteration method, iterations

Assignment / Questions:

1. problems on jacobi iteration method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/24/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:22 **Duration of Lesson:**1 hr

Lesson Title: Gauss - Siedel Iteration

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Gauss - Siedel Iteration, iterations

Assignment / Questions:

1. problems on gauss - siedel iteration

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/24/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:23 **Duration of Lesson:**1 hr

Lesson Title: Introduction to Eigen Values & Eigen Vectors

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Introduction to Eigen Values & Eigen Vectors and its applications

Assignment / Questions:

1. problems on eigen values & eigen vectors

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/28/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:24 **Duration of Lesson:**1 hr

Lesson Title: Jacobi method for symmetric matrices

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Jacobi method for symmetric matrices, Matrix Properties

Assignment / Questions:

1. problems using symmetric matrices

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/29/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:25 **Duration of Lesson:**1 hr

Lesson Title: Power Method, Inverse Power Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Power Method, Inverse Power Method Uses

Assignment / Questions:

1. problems on inverse power method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/31/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:26 **Duration of Lesson:**1 hr

Lesson Title: Nearest Eigen Value by Power Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Nearest Eigen Value by Power Method

Assignment / Questions:

1. problems on value by power method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 12/31/2021**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:27 **Duration of Lesson:**1 hr

Lesson Title: Solution of Nonlinear Algebraic and Transcendental Equations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Solution of Nonlinear Algebraic and Transcendental Equations

Assignment / Questions:

1. problems on nonlinear algebraic and transcendental equations

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 1/4/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:28 **Duration of Lesson:**1 hr

Lesson Title: Bisection Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Bisection Method and Convergence

Assignment / Questions:

1. problems on bisection method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 1/5/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:29 **Duration of Lesson:**1 hr

Lesson Title: Fixed-Point Iteration Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Fixed-Point Iteration Method and Convergence

Assignment / Questions:

1. problems on method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 1/7/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:30 **Duration of Lesson:**1 hr

Lesson Title: Secant Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Secant Method and Convergence

Assignment / Questions:

1. problems on secant method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 1/7/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:31 **Duration of Lesson:**1 hr

Lesson Title: Newton Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Newton Method and Convergence

Assignment / Questions:

1. problems on newton method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 1/25/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:32 **Duration of Lesson:**1 hr

Lesson Title: Regula Falsi Methods

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Regula Falsi Methods and Convergence

Assignment / Questions:

1. problems on Regula Falsi methods

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 1/28/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:33 **Duration of Lesson:**1 hr

Lesson Title: Rate of Convergences

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Rate of Convergences and identifying best method

Assignment / Questions:

1. problems on convergences

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 1/28/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:34 **Duration of Lesson:**1 hr

Lesson Title: Unconstrained Optimization

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Unconstrained Optimization

Assignment / Questions:

1. problems on unconstrained optimization

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/1/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:35 **Duration of Lesson:**1 hr

Lesson Title: Numerical Solution of Ordinary differential equations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Numerical Solution of Ordinary differential equations

Assignment / Questions:

1. problems on ordinary differential equations

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/2/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:36 **Duration of Lesson:**1 hr

Lesson Title: Numerical Integration

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Numerical Integration, Area under the Curve

Assignment / Questions:

1. problems on integration

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/4/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:37 **Duration of Lesson:**1 hr

Lesson Title: Double integration using Trapezoidal method.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Double integration using Trapezoidal method, approximations

Assignment / Questions:

1. integral problems using trapezoidal method.

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/4/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:38 **Duration of Lesson:**1 hr

Lesson Title: Double integration using Simpson's method.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Double integration using Simpson's method, errors

Assignment / Questions:

1. integral problems simpson's method.

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/8/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:39 **Duration of Lesson:**1 hr

Lesson Title: Integration Methods Problem Solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Integration Methods and their accuracy

Assignment / Questions:

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/9/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:40 **Duration of Lesson:**1 hr

Lesson Title: Numerical Solution of Partial differential equations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Numerical Solution of Partial differential equations

Assignment / Questions:

1. problems on of partial differential equations

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/11/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:41 **Duration of Lesson:**1 hr

Lesson Title: Euler's method – Backward Euler method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Euler's method – Backward Euler method

Assignment / Questions:

1. problems on backward euler method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/11/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:42 **Duration of Lesson:**1 hr

Lesson Title: Midpoint method – single step method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Midpoint method – single step method

Assignment / Questions:

1. problems on single step method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/15/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:43 **Duration of Lesson:**1 hr

Lesson Title: Euler's Method Problem Solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Euler's Method and its accuracy

Assignment / Questions:

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/16/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:44 **Duration of Lesson:**1 hr

Lesson Title: Taylor's series method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Taylor's series method

Assignment / Questions:

1. problems on taylor's series method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/18/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:45 **Duration of Lesson:**1 hr

Lesson Title: Taylor's series method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Taylor's series method problems

Assignment / Questions:

1. problems on taylor's series method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/18/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:46 **Duration of Lesson:**1 hr

Lesson Title:R-K Methods

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

R-K Methods Ist order and 2nd Order

Assignment / Questions:

1. problems on R-K methods

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/22/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:47 **Duration of Lesson:**1 hr

Lesson Title:R-K Methods

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

R-K Methods 3rd Order and 4th Order

Assignment / Questions:

1. problems on R-K methods

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/23/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:48 **Duration of Lesson:**1 hr

Lesson Title: Boundary value problems by finite difference method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Boundary value problems by finite difference method

Assignment / Questions:

1. problems on problems by finite difference method

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/25/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:49 **Duration of Lesson:**1 hr

Lesson Title: Boundary value problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Problem Solving

Assignment / Questions:

1. boundary value problems

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 2/25/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:50 **Duration of Lesson:**1 hr

Lesson Title: Finite Difference schemes

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Finite Difference schemes methods

Assignment / Questions:

1. problems on finite difference schemes

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 3/2/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:51 **Duration of Lesson:**1 hr

Lesson Title: Implicit scheme

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Implicit scheme, uses

Assignment / Questions:

1. problems on implicit scheme

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 3/4/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:52 **Duration of Lesson:**1 hr

Lesson Title: Explicit scheme

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Explicit scheme, uses

Assignment / Questions:

1. problems on explicit scheme

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 3/4/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:53 **Duration of Lesson:**1 hr

Lesson Title: Computer Algorithms

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Computer Algorithms, writing basic mathematical programs

Assignment / Questions:

1. write an algorithm to find the highest number of three

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 3/8/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:54 **Duration of Lesson:**1 hr

Lesson Title: Numerical Solutions for Different Structural Problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Numerical Solutions for Different Structural Problems

Assignment / Questions:

1. Explain about numerical solutions for different structural problems

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 3/9/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:55 **Duration of Lesson:**1 hr

Lesson Title: Fuzzy Logic Neural Network.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Fuzzy Logic and its Applications

Assignment / Questions:

1. Write about fuzzy logic and its applications

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year:2021-22 **Date: 3/11/2022**

Name of the Program :M.Tech. **Year :**I **Semester:** I

Course/Subject:ANMSE **Course Code:** GR20D2006

Name of the Faculty: Mr. V Naresh Kumar Varma

Department: Structural Engineering (CIVIL)

Designation: Assistant Professor

Lesson No:56 **Duration of Lesson:**1 hr

Lesson Title: Neural Network

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

TEACHING AIDS **:**White Board, Marker, Scientific Calculator

TEACHING POINTS **:**

Neural Network and its Applications

Assignment / Questions:

1. Write about neural networks and its applications

Signature of faculty

GokarajuRangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

ASSIGNMENTS / TUTORIALS

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

Assignment – 1 Questions

1. Calculate the maximum absolute error by performing four iterations of the Gauss-Seidel method for solving the system of given equations by comparing it with the exact solution.

$$4x+2z = 6$$

$$5y +2z = -3$$

$$5x+4y +10z=11$$

2) Solve the system of equations by Gauss Elimination Method.

$$x+y +z=6$$

$$3x+3y +4z=20$$

$$2x+y +3z=13$$

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ASSIGNMENTS / TUTORIALS

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** I

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

Assignment – 2 Questions

1) Estimate the population for the year 1995 from the following data using Newton's forward difference interpolation and Newton's backward difference interpolation.

Year	1921	1931	1941	1951	1961
Population(in thousands)	46	66	81	98	101

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Dept.: Structural Engineering (Civil Engineering)

Assignment – 3 Questions

2) Derive the formulas for the first derivative of $y = f(x)$of $O(h^2)$using forward difference approximations and backward difference approximations. Using these estimate $f'(\frac{\pi}{4})$, with $h = \frac{\pi}{12}$, when $f(x) = \sin x$. Obtain the bounds in truncation error and compare with exact solution.

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Dept.: Structural Engineering (Civil Engineering)

Assignment – 4 Questions

1. Explain the procedure to evaluate any given function using Simpson's (⅓)rd rule and also evaluate $\int_0^1 \frac{1}{1+X} dx$ using Simpson's 3/8 rule.

2. Give $du/dt=t^2 + u^2$, and $u(0)=1$,obtain Taylor Series for u(t) obtained from first two non-zero terms and hence Compute u(1).

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Assignment – 5 Questions

1. Solve the initial value problem $u' = -2tu^2$ with $u(0)=1$ and $h=0.2$ on the interval [0, 0.4]. Use fourth order classical Runge Kutta method. Compare with exact solution.

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Dept.: Structural Engineering (Civil Engineering)

Tutorial – 1 Questions

1. Determine the largest Eigen value in modulus and corresponding Eigen vectors of matrix

$$A = \begin{pmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{pmatrix}$$

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Tutorial – 2 Questions

1. Using Lagrange's method, find the polynomial f(x) and hence find f(2).

x	1	3	4
y	-3	0	30

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Tutorial – 3 Questions

1. Give $du/dt=t^2 + u^2$, and $u(0)=1$,obtain Taylor Series for u(t) obtained from first two non-zero terms and hence Compute u(1).

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ASSIGNMENTS / TUTORIALS

Academic Year : 2021-22

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Tutorial – 4 Questions

1. Find the Jacobian matrix for the system of equations

   $F_1(x, y) = x^2 + y^2 – x = 0$

   $F_2(x, y) = x^2 - y^2 – x = 0$

2. Evaluate $\int_0^{\pi/2} \cos(x)dx$ by using trapezoidal rule taking 6 intervals.

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ASSIGNMENTS / TUTORIALS

Academic Year : 2021-22

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Course/Subject : ANMSE **Course Code** : GR20D2006

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Dept.: Structural Engineering (Civil Engineering)

Tutorial – 5 Questions

1. Solve the initial value problem $u' = -2tu^2$ with $u(0)=1$ and $h=0.2$ on the interval $[0, 0.4]$ using Backward Euler Method

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Department of Civil Engineering

EVALUATION STRATEGY

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year **Semester:** II

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

1. TARGET:
a) Percentage for pass: 100%
b) Percentage of class: 100%

First class with distinction	21
First class	21
Pass class	-
Total strength	21

2. **COURSE PLAN & CONTENT DELIVERY**

- 56 Theory classes held for detailed demonstration of Syllabus and for analyzing real time problems in the class.

3. **METHOD OF EVALUATION**

3.1 ☐ Continuous Assessment Examinations (CAE-I, CAE-II)

3.2 ☐ Assignments

3.3 ☐ Projects

3.4 ☐ Quiz

3.5 ☐ Semester/End Examination

3.6 ☐ Others

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MAPPING

GR20D2006 / **ANMSE**	**Course Outcomes**				
Course Objectives	1	2	3	4	5
1	X				
2		X			
3			X		
4				X	
5					X

Assessments

1. Assignment 2. Internal Examination 3. External Examination

4. Practical Projects 5. Viva

GR20D2006 / **ANMSE**	**Course Outcomes**				
Assessments	1	2	3	4	5
1	X	X	X	X	X
2	X	X	X	X	X
3	X	X	X	X	X
4					
5					

GR20D2006 / **ANMSE**	**Course Objectives**				
Assessments	1	2	3	4	5
1	X	X	X	X	X
2	X	X	X	X	X
3	X	X	X	X	X
4					
5					

GR20D2006 / **ANMSE**						
COs/POs	**A**	**B**	**c**	**d**	**e**	**f**
1.	H			M	H	M
2.	H	M		M		
3.	H	M		M		
4.	H	M		M		
5.	H	M		M		

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RUBRICS FOR COURSE

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year**Semester:** II

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

		Beginning	Developing	Reflecting Development	Accomplished	Exemplary	Score
Name of the Student	**Performance Criteria**	**1**	**2**	**3**	**4**	**5**	
21241A02007	Level of knowledge on illustrating the fundamental concepts of matrices and its properties	Low Level	Able to understand	Able to understand and explain	Full Knowledge	Analyzing and application of knowledge	5
	Level of knowledge on interpolation, differentiation and integration	Low Level	Able to understand	Able to understand and explain	Full Knowledge	Analyzing and application of knowledge	4
	Level of knowledge on initial value problems and boundary value problems	Low Level	Able to understand	Able to understand and explain	Full Knowledge	Analyzing and application of knowledge	3

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COURSE COMPLETION STATUS

Academic Year : 2021-22

Name of the Program : M.Tech **Year:** I Year **Semester:** II

Course/Subject : ANMSE **Course Code** : GR20D2006

Name of the Faculty : V Naresh Kumar Varma

Dept.: Structural Engineering (Civil Engineering)

Actual Date of Completion &Remarks, if any

Units	Remarks	Objectives Achieved	Outcomes Achieved
Unit I	10-12-2021 Unit covered on time	1	1
Unit II	31-12-2021 Unit covered on time	2	2
Unit III	04-02-2022 Unit delayed by one week	3	3
Unit IV	25-02-2022 Unit covered on time	4	4
Unit V	11-03-2022 Unit covered on time	5	5

Signature of HOD Signature of faculty

Date: Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

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Department of Civil Engineering (Structural Engineering)

ANALYTICAL AND NUMERICAL METHODS FOR STRUCTURAL ENGINEERING

[GR20D5006]

Exam: Mid-I. Time: 15 minutes

Year & Sem: I M.Tech. I Sem. Date: 08-02-2022

PART – A

Five Multiple Choice Questions. Each Question carries ½ mark **10 x ½ = 5 marks**

1. Represent 625.12546 in normalized floating-point representation. **CO1, BL2** **[ ]**

A. $(-1)^0$ x 62.512546 x 10^1 **C.** $(-1)^0$ x 0.62512546 x 10^3

B. $(-1)^0$ x 6.2512546 x 10^2 **D.** $(-1)^0$ x 625.12546 x 10^0

2. The exponent e is limited to a range m < e < M then if some computed number has an exponent e < m, this can be termed as **CO1, BL2** **[ ]**

A. Memory Underflow **C.** NaN

B. Memory Overflow **D.** None of the mentioned

3. Error is equal to **CO2, BL1** **[ ]**

A. Distance between the data points **C.** Half the distance between the data points

B. Square of the distance between the data points **D.** None of the mentioned

4. Which of the following method uses determinants to solve systems of equations that have the same number of equations as variables? **CO2, BL1** **[ ]**

A. Gauss Elimination Method **C.** Triangulation Method

B. Gauss Jordan Elimination **D.** Cramer's rule

5. A transcendental equation may have _____depending on the form of f (x). **CO3, BL2[ ]**

A. One root **C.** Infinite number of roots

B. No root **D.** A or B or C

6. Gauss Siedel iteration method is also known as method of _____displacements.**CO2, BL1[]**

A. Successive **C.** Simultaneous

B. Consecutive **D.** None of the mentioned

7. In the Gauss Elimination method for solving a system of linear algebraic equations, triangularization leads to _____matrix. **CO3, BL2** **[ ]**

A. Diagonal **C.** Upper Triangular

B. Lower Triangular **D.** Identity

8. _____ error is a measure of the error in relation to the size of the true value. **CO3, BL1[]**

A. True **C.** Percentage

B. Relative **D.** Absolute

9. The determinant of matrix contains either a row of zeros or a column of zeros is ____.**CO2, BL2 []**

A. One **C.** Two

B. Three **D.** Zero

10. The line is tangent to the parabola and intersects the parabola at exactly one point then the system has how many solution/s? **CO1, BL2** **[ ]**

A. One

B. Three

C. Two

D. Zero

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

Department of Civil Engineering (Structural Engineering)
ANALYTICAL AND NUMERICAL METHODS FOR STRUCTURAL ENGINEERING
[GR20D5006]

Exam: Mid-I. Time: 75 minutes

Year & Sem: I M.Tech. I Sem. Date: 08-02-2022

PART – B

Internal Choice Three Questions. Each Question carries 5 marks **3 x 5 = 15 marks**

1. **(a)** Explain about Floating Point Approximation and Error propagation. **CO1, BL2**

(b) Define (i) Absolute Error, (ii) Relative Error and (iii) Percentage Error. **CO1, BL1**

OR

2. **(a)** Using Lagrange's method, find the polynomial f(x) and hence find f(5). **CO1, BL3**

x	1	3	4	6
f	-3	0	30	132

(b) Find f(x) and compute f(0.3) for the data **CO1, BL3**

x	0	1	3	4
f	1	3	49	129

using Newton's divided difference formula.

3. Solve the following system by Gauss Seidel Iteration Method. Perform 4 iterations. **CO2, BL4**

$$10x - 5y - 2z = 3$$

$$4x - 10y + 3z = -3$$

$$x + 6y + 10z = -3$$

OR

4. Solve the following system by Gauss Elimination method. **CO2, BL4**

$$83x + 11y - 4z = 95$$

$$7x + 52y + 13z = 104$$

$$3x + 3Y + 29z = 71$$

5. Determine the approximate root of the equation **CO3, BL5**

$$2x^6 - 5x^4 + 2 = 0$$

in the interval [0, 1] after performing six iterations in the Bisection method.

OR

6. Determine the roots of the following equation using Fixed point Iteration method after performing six iterations **CO3, BL5**

$$x^2 - 2x - 5 = 0$$

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(Autonomous)

Department of Civil Engineering (Structural Engineering)

ANALYTICAL AND NUMERICAL METHODS FOR STRUCTURAL ENGINEERING [GR20D5006]

Exam:Mid-II. Time: 15 minutes

Year & Sem: I M.Tech.I Sem. Date:15-03-2022

PART – A

Five Multiple Choice Questions. Each Question carries½mark **10 x ½ = 5marks**

1. An example of an algebraicequationis **CO3, BL2** **[ ]**
- **A.** $tan\ x = e^x$
- **B.** $x = logx$
- **C.** $x^3 - 5x + 3 = 0$
- **D.** None

2. Which of the following methods has linear rateofconvergence? **CO3, BL2** **[ ]**
- **A.** Regularfalse
- **B.** Bisection
- **C.** Newton-Raphson
- **D.** None

3. The two initial values to find roots of the equation $x^3 - x - 3 = 0$ in bisectionmethod are **[ ]**
- **A.** (–1, 0)
- **B.** (1, 2)
- **C.** (–2, 1)
- **D.** (1, 0)

4. If $y = -cosx$, theny'''= **CO4, BL4** **[ ]**
- **A.** $sin\ x$
- **B.** $-\ sin\ x$
- **C.** $-\ cos\ x$
- **D.** $cos\ x$

5. if $f(x) = x^{\pi}$, then$f(1)$= **CO4, BL4** **[ ]**
- **A.** $22/7$
- **B.** $7/22$
- **C.** $22/7\ x^{15/7}$
- **D.** $7/22\ x^{15/7}$

6. Evaluate the integral of $dx / (x + 2)$ from -6 to -10. **CO4, BL5** **[ ]**
- **A.** $21/2$
- **B.** $1/2$
- **C.** $ln\ 3$
- **D.** $ln\ 2$

7. Evaluate the integral of $sin^5\ x\ dx$ if the lower limit is 0 and the upper limit is $\pi/2$? **CO4,BL5** **[ ]**
- **A.** *0.233*
- **B.** *0.533*
- **C.** *0.333*
- **D.** *0.433*

8. When an algorithm is written in the form of a programming language, it becomes a**CO5,BL2** **[ ]**
- **A.** Flowchart
- **B.** Program
- **C.** Pseudo code
- **D.** Syntax

9. Algorithms can be representedas **CO5,BL2** **[ ]**
- **A.** pseudocodes
- **B.** flowcharts
- **C.** programs
- **D.** all the above

10. Pseudocode is used for **CO5,BL2** **[ ]**
- **A.** To write program steps
- **B.** For coding the program
- **C.** Denoting program flow
- **D.** None of the above

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ANALYTICAL AND NUMERICAL METHODS FOR STRUCTURAL ENGINEERING [GR20D5006]

Exam:Mid-II.

Time: 75 minutes

Year & Sem: I M.Tech.I Sem.

Date:15-03-2022

PART – B

Internal Choice Three Questions. Each Question carries5marks3 x 5 = 15 marks

1) Determine the root of the equation $cosx–xe^x = 0$by the method of Newton Raphson's method with initial assumption of $x_0=1$. Perform at least 6iterations.
CO3, BL4

OR

2) Determine real root of the equation $f(x) = x^3 – 2x – 5 = 0$by method of False position. Perform at least 6iterations.
CO3, BL4

3) **(a)** Evaluate the double integral using the Simpson's rule with foursubintervals

$$\int_1^5 \left(\int_1^5 \frac{dx}{(x^2+y^2)^{1/2}} \right) dy$$

CO4, BL5

(b) Given the following values of $f(x) = x^4$. Determine

$f'(0.8)$&$f''(0.8)$using quadratic interpolation.

CO4, BL4

x	0.4	0.6	0.8
$f(x)$	0.0256	0.1296	0.4096

OR

4) Solve the initial value problem $u^l = -2tu^2$with $u(0)=1$and $h=0.2$on the interval

[0, 0.4]. Use fourth order classical Runge Kutta method. Compare with exactsolution. **CO4, BL5**

5) Use the Finite Difference method to approximate the solution of the boundary valueproblem

CO5, BL4

$$y''(x) - 2y(x) = 0,\ y(0) = 1.2,\ y(1.0) = 0.9,\qquad h = 0.25$$

OR

6) Define Algorithm, Fuzzy Logic and Neural Networks. List out the applications of Fuzzy Logic and Neural Networks in CivilEngineering.

CO5, BL1

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ANMSE INTERNAL MARKS

Roll No	Mid-I	Mid-II	Avg	Assesment	Attendance	Total
21241D2001	18	13	16	4	4	24
21241D2002	17	18	18	5	4	27
21241D2003	17	16	17	5	5	27
21241D2004	13	17	15	5	4	24
21241D2005	16	18	17	5	5	27
21241D2006	17	18	18	5	5	28
21241D2007	16	18	17	5	5	27
21241D2008	14	12	13	5	4	22
21241D2009	16	19	18	5	5	28
21241D2010	14	15	15	5	4	24
21241D2011	14	18	16	5	5	26
21241D2012	14	14	14	5	4	23
21241D2013	9	10	10	5	5	20
21241D2014	17	17	17	5	5	27
21241D2015	16	13	15	5	5	25
21241D2016	15	19	17	5	5	27
21241D2017	9	11	10	5	5	20
21241D2018	16	14	15	5	4	24
21241D2019	AB	AB	AB	3	4	7
21241D2020	7	10	9	3	4	16
21241D2021	13	11	12	5	4	21