UNIT – I D.C. AND A.C CIRCUITS **6**

Ohm's law – Kirchoff's Laws, V – I Relationship of Resistor (R) Inductor (L) and capacitor (C).Series parallel combination of R, L&C – Current and voltage source transformation – mesh current & node voltage method –superposition theorem – Thevenin's and Norton's Theorem - Problems.

UNIT – II ELECTRICAL MACHINES **6**

Construction, principle of operation, Basic Equations and applications - D.C.Generators and D.C.Motors. -Single phase Induction Motor - Single Phase Transformer.

UNIT – III BASIC MEASURMENT SYSTEMS **6**

Introduction to Measurement Systems, Construction and Operating principles of PMMC, Moving Iron, Dynamometer Wattmeter, power measurement by three-watt meter and two watt method – and Energy meter.

UNIT IV – SEMICONDUCTOR DEVICES **6**

Basic Concepts of semiconductor devices – PN Junction Diode Characteristics and its Application – HWR, FWR – Zener Diode – BJT (CB, CE, CC) configuration & its characteristics.

UNIT V – DIGITAL ELECTRONICS **6**

Number system – Logic Gates – Boolean Algebra – De-Morgan's Theorem – Half Adder & FullAdder – Flip Flops.

Total No. of Periods: 30

TEXT BOOKS:

1. N.Mittle "Basic Electrical Engineering". Tata McGraw Hill Edition, New Delhi, 1990.
2. A.K. Sawhney, 'A Course in Electrical & Electronic Measurements & Instrumentation',Dhanpat Rai and Co, 2004.
3. Jacob Millman and Christos C-Halkias, "Electronic Devices and Circuits", Tata McGraw Hill

REFERENCE BOOKS:

1. Edminister J.A. *"Theory and problems of Electric Circuits"*, Schaum's Outline Series. McGraw Hill Book Company, 2nd Edition, 1983.
2. Hyatt W.H and Kemmerlay J.E. "*Engineering Circuit Analysis*", McGraw Hill Internatinal Editions, 1993.
3. D. P. Kothari and I. J. Nagrath "Electric machines" Tata McGraw-Hill Education, 2004
4. Millman and Halkias, "Integrated Electronics", Tata McGraw Hill Edition,2004.

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
G.Subashini	II-A, B	JR001		Subashini.maths@ bharathuniv.ac.in	9.00 - 9.50 AM
Mr.Pari	II-C	JR003		Pari.maths@ bharathuniv.ac.in	11.40 -12.30 PM
Ms.Arthi	II-D,E	JR004		Arthi.maths@gmail.com	10.50 - 11.40 AM

Computer usage: Nil

Professional component

General	-	0%
Basic Sciences	-	100%
Engineering sciences & Technical arts	-	00%
Professional subject	-	0%

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I SOLUTION OF EQUATION AND EIGEN VALUE PROBLEMS			
1.	ITERATION METHOD -INTRODUCTION	Yes	[T1]
2.	NEWTON RAPHSON METHOD FOR SINGLE VARIABLE	Yes	
3.	PROBLEMS	Yes	
4.	SOLUTION OF LINEAR SYSTEM BY GEM	Yes	
5.	GAUSS JORDAN METHOD	Yes	
6.	GAUSS JACOBI METHOD	Yes	
7.	GUASS SIEDEL METHOD	Yes	
8.	PROBLEMS	Yes	
9.	INVERSE OF THE MATRIX BY GJM	Yes	
10.	EIGEN VALUE OF MATRIX BY POWER METHOD	Yes	
11.	EIGEN VALUE OF MATRIX BY GACOBI METHOD	Yes	
12.	PROBLEMS	Yes	
UNIT II INTERPOLATION(FINITE DIFFERENCE)			
13.	FINITE DIFFERENCE-FORWARD TABLE	Yes	[T2]
14.	FINITE DIFFERENCE-BACKWARD TABLE	Yes	
15.	PROBLEMS	Yes	
16.	NEWTONS FORWARD INTERPOLATION FORMULA	Yes	
17.	NEWTON BACKWARD INTERPOLATION FORMULA	Yes	
18.	NEWTON’S DIVIDED DIFFERENCE FORMULA	Yes	
19.	PROBLEMS	Yes	
20.	LAGRANGES INTERPOLATION FORMULA	Yes	
21.	INVERSE INTERPOLATION	Yes	
22.	STIRLINGS FORMULA	Yes	
23.	BESSELS FORMULAA	Yes	
24.	PROBLEMS	Yes	
UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION			
25.	NEWTONS FORWARD DIFFERENCE FORMULA TO GET THE DERIVATIVES	Yes	[T3]
26.	NEWTONS BACKWARD DIFFERENCE FORMULA TO GET THE DERIVATIVESW	Yes	
27.	TO FIND THE MAXIMA AND MINIMA OF A FUNCTION GIVEN THE TABULAR VALUES	Yes	
28.	PROBLEMS	Yes	
29.	NUMERICAL INTEGRATION	Yes	
30.	TRAPEZOIDAL RULE	Yes	
31.	SIMPSONS ONE THIRD AND THREE EIGTH RULE	Yes	

32.	PROBLEMS	yes	
33.	ROMBERGS METHOD	Yes	
34.	TRAPEZOIDAL RULE FOR DOUBLE INTEGRATION	Yes	
35.	SIMPSONS RULE FOR DOUBLEINTEGRATION	Yes	
36.	PROBLEMS	Yes	
UNIT IV INTIAL VALUE PROBLEMS FOR ODE			
37.	SOLUTIONS BY TAYLORS SERIES	Yes	[T4]
38.	TAYLORS SERIES-HIGHER ORDER DIFFERENTIAL EQUATIONS	Yes	
39.	EULERS AND MODIFIED EULERS METHOD	Yes	
40.	PROBLEMS	Yes	
41.	**I AND II ORDER DIFFERENTIAL EQUATIONS**	Yes	
42.	**RUNGE KUTTA METHOD**	Yes	
43.	RUNGE KUTTA METHOD-HIGHER ORDER DE	Yes	
44.	PROBLEMS	Yes	
45.	RK METHOD FOR SIMULTANEOUS FIRSR ORDER EQUATION	Yes	
46.	MILENS PREDICTOR AND CORRECTOR METHOD	Yes	
47.	ADAMS BASHFORTH PREDICTOR AND CORRECTOR FORMULA	Yes	
48.	PROBLEMS	Yes	
UNIT V BOUNDARY VALUE PROBLEM FOR ODE AND PDE			
49.	CLASSIFICATION OF PDE OF SECOND ORDER	Yes	[T5]
50.	DIFFERENCE QUOTIENTS FORMULA	Yes	
51.	SOLUTION OF LAPALCE EQUATION	Yes	
52.	LIEBMANNS ITERATION PROCESS	Yes	
53.	PROBLEMS	Yes	
54.	DIAGONAL FIVE POINT FORMULA	Yes	
55.	STANDARD FIVE POINT FORMULA	Yes	
56.	PROBLEMS	Yes	
57.	BENDER SCHMIDT METHOD	Yes	
58.	CRANK NICHOLSON METHOD	Yes	
59.	HYPERBOLIC EQUATION	Yes	
60.	PROBLEMS	Yes	

Broad area : Eigen values, Interpolation, Numerical integration and Differentiation, Initial value problems for ODE, Boundary value problems for ODE and PDE.

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	February 2nd week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2nd week	Session 15 to 28	2 Periods
3	Model Test	April 3rd week	Session 1 to 45	3 Hrs
5	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

To develop problem solving skills and understanding of Mathematics. This course emphasizes:	Correlates to program outcome		
	H	M	L
1. To develop an understanding of the fundamentals in finding the solutions of the equation and to find the eigen vaue of the matrix	b,c,d,j	a,f,k	e,g
2. To develop the ability to solve problems in Interpolation	b,c,f	a,d,g,h	j
3. To understand the concepts of Numerical Differentiation and Integration	a,d,e	b,g	j,k
4. To develop students problem solving techniques for Initial value problems for ODE	a,d,e	b,g,h,k	f,j
5. To learn the uses of Boundary value problems for ODE and PDE	a	a,b,c,d,g	j,k

H: high correlation, M: medium correlation, L: low correlation

Draft Lecture Schedule

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	10%
Assignment / Seminar / Online Test / Quiz	-	5%
Attendance	-	5%
Final exam	-	70%

Prepared by: G.SUBASHINI , Assistant professor , Department of Mathematics

Addendum

ABET Outcomes expected of graduates of B.Tech / MECH / program by the time that they graduate:

a) The ability to apply knowledge of mathematics, science, and engineering fundamentals.

b) The ability to identify, formulate and solve engineering problems.

c) The ability to design a system, component, or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

d) The ability to design and conduct experiments, as well as to analyze and interpret data

e) The ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

f) The ability to apply reasoning informed by the knowledge of contemporary issues.

g) The ability to broaden the education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

h) The ability to understand professional and ethical responsibility and apply them in engineering practices.

i) The ability to function on multidisciplinary teams.

j) The ability to communicate effectively with the engineering community and with society at large.

k) The ability in understanding of the engineering and management principles and apply them in project and finance management as a leader and a member in a team.

l) The ability to recognize the need for, and an ability to engage in life-long learning.

Program Educational Objectives

PEO1: PREPARATION:
Mechanical Engineering graduatesare enthusiastic to provide strong foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems in the field of Mechanical Engineering.

PEO2: CORE COMPETENCE:
Mechanical Engineering graduates have competence to enhance the skills and experience in defining problems in the field of Mechanical Engineering and Technology design and implement, analyzing the experimental evaluations, and finally making appropriate decisions.

PEO3: PROFESSIONALISM:
Mechanical Engineering graduates made competence to enhance their skills and embrace new thrust areas through self-directed professional development and post-graduate training or education.

PEO4: PROFICIENCY:
Mechanical Engineering graduates became skilled to afford training for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

PEO5: ETHICS:
Mechanical Engineering graduates are morally merged to apply the ethical and social aspects of modern Engineering and Technology innovations to the design, development, and usage of new products, machines, gadgets, devices, etc.

Course Teacher	Signature
G.Subashini Mr.Pari Ms.Arthi	

Course Coordinator **HOD/MECH**

Ms.Arthi