LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC & NBA (Under Tier - I), ISO 21001:2018 Certified
Institution Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.
Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF FRESHMAN ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. Mallikharjuna Rao Darla
Course Name & Code **:**Chemistry& 23FE06
L-T-P Structure **:3-0-0** **Credits:03**
Program/Sem/Sec : B. Tech./Sem-II/ASE **A.Y. :**2024-25

PREREQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To enable the students to understand the fundamental concepts of chemistry and to provide them with the knowledge of industrial problems and finding the solutions.
- To strengthen the basic concepts of bonding models, advanced engineering materials, electrochemistry, batteries and polymers.
- To introduce instrumental methods and their applications.

COURSE OUTCOMES (COs): At the end of the course, student will be able to
CO1: Identify the troubles due to hardness of water and its maintenance in industrial applications. (**Understand**)
CO2: Apply Nernst equation in calculating cell potentials, compare batteries for different applications and outline the principles of corrosion for design and effective maintenance of various devices. (**Understand)**
CO3: Outline the importance of polymers and alternate fuels. (**Understand**)
CO4: Summarize the suitability of engineering materials like composites, refractories, lubricants, and building materials. (**Understand**)
CO5: Understand the concepts of collides, micelles and nanomaterials. (**Understand**)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	1
CO2	3	2	2	2	-	2	2	-	-	-	-	2
CO3	3	3	2	2	-	2	2	-	-	-	-	2
CO4	3	2	2	2	-	2	2	-	-	-	-	2
CO5	3	2	1	1	-	-	-	-	-	-	-	1
1 = Slight (Low) **2 = Moderate (Medium)** **3 = Substantial (High)**												

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference: Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

PART-B

Course handout (Lesson plan): ASE

UNIT-I: WATER TECHNOLOGY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to CO's, PO's of EC	1	20-01-2025		TLM1	
2.	Soft and hard water, Estimation of hardness of water by EDTA Method	1	21-01-2025		TLM1	
3.	Estimation of dissolved Oxygen	1	22-01-2025		TLM1	
4.	Boiler troubles – Priming, foaming	2	25-01-2025 & 27-01-2025		TLM1	
5.	Scale and sludge, Caustic embrittlement	2	28-01-2025 & 29-01-2025		TLM1	
6.	Industrial water treatment	1	01-02-2025		TLM1	
7.	Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization (WHO) standards	1	03-02-2025		TLM1	
8.	Ion-exchange processes - desalination of brackish water	1	04-02-2025		TLM1	
9.	Reverse osmosis (RO) and Electro dialysis	2	05-02-2025 & 08-02-2025		TLM1	
10.	Revision and assignment	2	10-02-2025 & 11-02-2025		TLM1	
No. of classes required to complete UNIT-I: 14				No. of classes taken:		

UNIT-II: ELECTROCHEMISTRY AND APPLICATIONS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Electrochemical cell, Nernst equation	1	12-02-2025		TLM1	
2.	Cell potential calculations and numerical problems	1	15-02-2025		TLM1	

3.	Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad)	2	17-02-2025 & 18-02-2025		TLM1	
4.	Lithium ion batteries-principle and cell reactions	1	19-02-2025		TLM1	
5.	Fuel cells-Basic Concepts, principle and working of hydrogen-oxygen Fuel cell.	1	22-02-2025		TLM1	
6.	Corrosion-Introduction, Classification, corrosion, electrochemical theory of corrosion	1	24-02-2025		TLM1	
7.	Metal oxide formation by dry electrochemical corrosion, Pilling Bed-worth ratios and uses	1	25-02-2025		TLM2	
8.	differential aeration cell corrosion, galvanic corrosion	1	26-02-2025		TLM2	
9.	Factors affecting the corrosion, cathodic and anodic protection	1	01-03-2025		TLM2	
10.	electroplating and electro less plating (Nickel and Copper)	2	03-03-2025 & 04-03-2025		TLM2	
11.	Revision and assignment	2	05-03-2025 & 08-03-2025		TLM1	
No. of classes required to complete UNIT-II: 14				No. of classes taken:		

UNIT-III: POLYMERS AND FUEL CHEMISTRY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to polymers, functionality of monomers	1	17-03-2025		TLM1	
2.	Mechanism of chain growth and step growth polymerization	1	18-03-2025		TLM1	
3.	Plastics –Thermo and Thermosetting plastics-Preparation, properties and applications of – Polystyrene, PVC, Teflon	2	19-03-2025 & 22-03-2025		TLM1	
4.	Preparation, properties and applications of – Bakelite, Nylon-6,6,	1	24-03-2025		TLM1	
5.	Elastomers: preparation, properties and applications Buna-S, Buna-N, Thiokol rubbers	2	25-03-2025 & 26-03-2025		TLM1	

6.	Fuels – Types of fuels, calorific value of fuels, numerical problems based on calorific value;	1	29-03-2025		TLM1	
7.	Analysis of coal (Proximate and Ultimate analysis)	1	01-04-2025		TLM1	
8.	Liquid Fuels, refining of petroleum, Octane and Cetane number	1	02-04-2025		TLM1	
9.	Alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.	1	05-04-2025			
10.	Revision and assignment	1	07-04-2025		TLM1	
No. of classes required to complete UNIT-IV: 12				No. of classes taken:		

UNIT-IV: MODERN ENGINEERING MATERIALS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Composites- Definition, Constituents, Classification- Particle, Fibre and Structural reinforced composites	2	08-04-2025 & 09-04-2025		TLM1	
2.	Properties and Engineering applications of composites	1	12-04-2025		TLM1	
3.	Refractories- Classification, Properties, Factors affecting the refractory materials and Applications	2	14-04-2025 & 15-04-2025		TLM1	
4.	Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index	1	16-04-2025		TLM1	
5.	Flash point, Fire point, Cloud point, saponification and Applications	1	19-04-2025		TLM1	
6.	Building materials- Portland Cement, constituents.	1	21-04-2025		TLM1	
7.	Setting and Hardening of cement.	1	22-04-2025		TLM1	
8.	Revision and assignment	1	23-04-2025		TLM1	
No. of classes required to complete UNIT-IV: 10				No. of classes taken:		

UNIT-V: SURFACE CHEMISTRY AND NANOMATERIALS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to surface chemistry, colloids.	1	26-04-2025		TLM1	
2.	Nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method)	2	28-04-2025 & 29-04-2025		TLM1	
3.	Chemical and biological methods of preparation of nanometals and metal oxides	2	30-04-2025 & 03-05-2025		TLM1	
4.	Stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Langmuir)	2	05-05-2025 & 06-05-2025		TLM1	
5.	BET equation (no derivation) applications of colloids and nanomaterials – catalysis, medicine, sensors,	2	07-05-2025 & 10-05-2025		TLM1	
6.	Revision and assignment	2	12-05-2025 & 13-05-2025		TLM1	
No. of classes required to complete UNIT-V: 11				No. of classes taken:		

TOPICS BEYOND THE SYLLABUS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Applications of semiconductors, superconductors and nanomaterials in advanced technologies.	2	14-05-2025 & 17-05-2025		TLM1	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/SwayamPrabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Objective Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (UNIT-III, IV & V)	M2=15
II-Objective Examination (UNIT-III, IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. Mallikharjuna Rao Darla	Dr.V.Parvathi	Dr.V.Parvathi	Dr.A.Rami Reddy
Signature				

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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:** I B. Tech., II-Sem., ASE
ACADEMIC YEAR	**:** 2024-25
COURSE NAME & CODE	**:** Differential Equations & Vector Calculus
L-T-P STRUCTURE	**:** 3-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**:** Dr. T.Radha Rani
COURSE COORDINATOR	**:** Dr. K.R. Kavitha
PRE-REQUISITES	**:** Basics of Vectors**,** Differentiation, Integration

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To enlighten the learners in the concept of differential equations and multivariable calculus
- To furnish the learners with basic concepts and techniques at intermediate level to lead them into advanced level by handling various real-world applications.

COURSE OUTCOMES (COs)

After completion of the course, the student will be able to

CO1: Solve the differential equations related to various engineering fields – **L3**

CO2: Apply knowledge of partial differentiation in modeling and solving of Partial differential equations – **L3**

CO3: Interpret the physical meaning of different operators such as gradient, curl and divergence – **L3**

CO4: Evaluate the work done against a field, circulation and flux using Vector Calculus – **L3**

COURSE ARTICULATION MATRIX (Correlation between Cos &POs, PSOs):

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	1
CO2	3	1	-	-	-	-	-	-	-	-	-	1
CO3	3	2	-	-	-	-	-	-	-	-	-	1
CO4	3	2	-	-	-	-	-	-	-	-	-	1

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**

1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 Dr. B.S. Grewal, "Higher Engineering Mathematics", 44nd Edition, Khanna Publishers, New Delhi, 2017.

T2 Erwin Kreyszig, *"Advanced Engineering Mathematics"*, 10th Edition, John Wiley & sons, New Delhi, 2018.

BOS APPROVED REFERENCE BOOKS:

R1 George B. Thomas, Maurice D. Weir and Joel Hass, "*Thomas Calculus*", 14th Edition, Pearson Publishers, 2018.

R2 Dennis G. Zill and Warren S. Jones and Bartlett, "*Advanced Engineering Mathematics*",2018.

R3 Glyn James, "*Advanced Modern Engineering Mathematics*", 5th Edition, Pearson Publishers, 2018.

R4 R.K. Jain and S.R.K. Iyengar, "*Advanced Engineering Mathematics*", 5th Edition (9th reprint), Alpha Science International Ltd., 2021.

R5 B. V. Ramana, "*Higher Engineering Mathematics*", 3rd Edition McGraw Hill Education, 2017.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to the course	1	20-01-2025		TLM2			
2.	Course Outcomes, Program Outcomes	1	22-01-2025		TLM2			

UNIT-I: Differential Equations of first order and first degree

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
3.	Introduction to UNIT I	1	23-01-2025		TLM1	CO1	T1,T2	
4.	Linear Differential equation	1	24-01-2025		TLM1	CO1	T1,T2	
5.	Bernoulli's DE	1	25-01-2025		TLM1	CO1	T1,T2	
6.	Exact DE	1	27-01-2025		TLM1	CO1	T1,T2	
7.	TUTORIAL - I	1	29-01-2025		TLM3	CO1	T1,T2	
8.	Non-exact DE Type I	1	30-01-2025		TLM1	CO1	T1,T2	
9.	Non-exact DE Type II	1	31-02-2025		TLM1	CO1	T1,T2	
10.	Non-exact DE Type III	1	01-02-2025		TLM1	CO1	T1,T2	
11.	Non-exact DE Type IV	1	03-02-2025		TLM1	CO1	T1,T2	
12.	Newton's Law of cooling	1	05-02-2025		TLM1	CO1	T1,T2	
13.	TUTORIAL - II	1	06-02-2025		TLM3	CO1	T1,T2	
14.	Law of natural growth and decay	1	07-02-2025		TLM1	CO1	T1,T2	
15.	Law of natural growth and decay	1	10-02-2025		TLM1	CO1	T1,T2	
16.	Electrical circuits	1	12-02-2025		TLM1	CO1	T1,T2	
No. of classes required to complete UNIT-I		14			No. of classes taken:			

UNIT-II: Linear Differential equations of higher order (Constant Coefficients)

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Introduction to UNIT II	1	13-02-2025		TLM1	CO1	T1,T2	
18.	Solving a homogeneous DE	1	14-02-2025		TLM1	CO1	T1,T2	
19.	Solving a homogeneous DE	1	15-02-2025		TLM1	CO1	T1,T2	
20.	Finding Particular Integral, P.I for e^{ax+b}	1	17-02-2025		TLM1	CO1	T1,T2	
21.	P.I for Cos bx, or sin bx	1	19-02-2025		TLM1	CO1	T1,T2	
22.	TUTORIAL - III	1	20-02-2025		TLM3	CO1	T1,T2	
23.	P.I for polynomial function	1	21-02-2025		TLM1	CO1	T1,T2	

24.	P.I for $e^{ax+b}v(x)$	1	22-02-2025		TLM1	CO1	T1,T2	
25.	P.I for $x^k v(x)$	1	24-02-2025		TLM1	CO1	T1,T2	
26.	TUTORIAL - IV	1	27-02-2025		TLM3	CO1	T1,T2	
27.	Method of Variation of parameters	1	28-02-2025		TLM1	CO1	T1,T2	
28.	Method of Variation of parameters	1	01-03-2025		TLM1	CO1	T1,T2	
29.	Simultaneous linear equations	1	03-03-2025		TLM1	CO1	T1,T2	
30.	L-C-R circuits	1	05-03-2025		TLM1	CO1	T1,T2	
31.	TUTORIAL - V	1	06-03-2025		TLM3	CO1	T1,T2	
32.	Simple Harmonic motion	1	07-03-2025		TLM1	CO1	T1,T2	
No. of classes required to complete UNIT-II		16			No. of classes taken:			

I MID EXAMINATIONS (10-03-2025 TO 15-03-2025)

UNIT-III: Partial Differential Equations

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
33.	Introduction to Unit III	1	17-03-2025		TLM1	CO2	T1,T2	
34.	Formation of PDE by elimination of arbitrary constants	1	19-03-2025		TLM1	CO2	T1,T2	
35.	TUTORIAL - VI	1	20-03-2025		TLM3	CO2	T1,T2	
36.	Formation of PDE by elimination of arbitrary functions	1	21-03-2025		TLM1	CO2	T1,T2	
37.	Solving of PDE	1	22-03-2025		TLM1	CO2	T1,T2	
38.	Solving of PDE	1	24-03-2025		TLM1	CO2	T1,T2	
39.	Lagrange's Method	1	26-03-2025		TLM1	CO2	T1,T2	
40.	TUTORIAL - VII	1	27-03-2025		TLM3	CO2	T1,T2	
41.	Lagrange's Method	1	28-03-2025		TLM1	CO2	T1,T2	
42.	Homogeneous Linear PDE with constant coefficients	1	29-03-2025		TLM1	CO2	T1,T2	
43.	Homogeneous Linear PDE with constant coefficients	1	02-04-2025		TLM1	CO2	T1,T2	
No. of classes required to complete UNIT-III		11			No. of classes taken:			

UNIT-IV: Vector Differentiation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
44.	Introduction to UNIT IV	1	03-04-2025		TLM1	CO3	T1,T2	
45.	Vector Differentiation	1	04-04-2025		TLM1	CO3	T1,T2	
46.	Gradient	1	07-04-2025		TLM1	CO3	T1,T2	

47.	Directional Derivative	1	09-04-2025		TLM1	CO3	T1,T2	
48.	Directional Derivative	1	10-04-2025		TLM1	CO3	T1,T2	
49.	Divergence	1	11-04-2025		TLM1	CO3	T1,T2	
50.	TUTORIAL VIII	1	16-04-2025		TLM3	CO3	T1,T2	
51.	Curl	1	17-04-2025		TLM1	CO3	T1,T2	
52.	Problems	1	19-04-2025		TLM1	CO3	T1,T2	
53.	Solenoidal fields, Irrotational fields, potential surfaces	1	21-04-2025		TLM1	CO3	T1,T2	
54.	Solenoidal fields, Irrotational fields, potential surfaces	1	23-04-2025		TLM1	CO3	T1,T2	
55.	TUTORIAL IX	1	24-04-2025		TLM3	CO3	T1,T2	
56.	Laplacian, second order operators	1	25-04-2025		TLM1	CO3	T1,T2	
57.	Vector Identities	1	26-04-2025		TLM1	CO3	T1,T2	
58.	Vector Identities	1	28-04-2025		TLM1	CO3	T1,T2	
No. of classes required to complete UNIT-IV		15			No. of classes taken:			

UNIT-V: Vector Integration

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
59.	Introduction to Unit-V	1	30-04-2025		TLM1	CO4	T1,T2	
60.	Line Integral	1	01-05-2025		TLM1	CO4	T1,T2	
61.	Circulation	1	02-05-2025		TLM1	CO4	T1,T2	
62.	Work done	1	03-05-2025		TLM1	CO4	T1,T2	
63.	Surface Integral	1	05-05-2025		TLM1	CO4	T1,T2	
64.	Surface Integral	1	07-05-2025		TLM1	CO4	T1,T2	
65.	TUTORIAL - X	1	08-05-2025		TLM3	CO4	T1,T2	
66.	Flux	1	09-05-2025		TLM1	CO4	T1,T2	
67.	Green's Theorem	1	12-05-2025		TLM1	CO4	T1,T2	
68.	Stoke's Thoerem	1	14-05-2025		TLM1	CO4	T1,T2	
69.	TUTORIAL - XI	1	15-05-2025		TLM3	CO4	T1,T2	
70.	Divergence Theorem	1	16-05-2025		TLM1	CO4	T1,T2	
No. of classes required to complete UNIT-V		12			No. of classes taken:			

Content beyond the Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
71.	Non-homogeneous Linear PDE with constant coefficients	1	17-05-2025		TLM2	CO2	T1,T2	
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (02-06-2025 TO 07-06-2025)								

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/SwayamPrabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-CEVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (UNIT-III, IV & V)	M2=15
II-Quiz Examination (UNIT-III, IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE):	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Dr. T.Radha Rani	**Dr. K.R. Kavitha**	**Dr. A. RAMI REDDY**	**Dr. A. RAMI REDDY**
Course Instructor	Course Coordinator	Module Coordinator	HOD

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.T.SATYANARAYANA/ Mr.R.ANJANEYULU NAIK
Course Name & Code **:** BASIC ELECTRICAL & ELECTRONICS ENGINEERING – 23EE01
L-T-P Structure **: 3-0-0** **Credits:** 3
Program/Branch/Sem/Sec: B.Tech/ASE II SEM **A.Y.:** 2024-25

Pre-requisites: Physics
Course Educational Objective:

To expose to the field of electrical & electronics engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.

- To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

	PART-A
CO1	Extract electrical variables of AC & DC circuits usin fundamental laws. **(Understand)**
CO2	Understand the operation of electrical machines and measuring instruments. **(Understand)**
CO3	Classify various energy resources, safety measures and interpret electricity bill generation in electrical sysems.
	PART-B
CO4	Interpret the characteristics of various semiconductor devices. **(Knowledge)**
CO5	Infer the operation of rectifiers, amplifiers. **(Understand)**
CO6	Contrast various logic gates, sequential and combinational logic circuits. **(Understand)**

CO-PO Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	2	3	_	_	_	_	_	_	_	_	1
CO 2	2	2	_	_	_	_	_	_	_	_	_	_
CO 3	2	2	_	_	_	3	_	_	_	_	2	2
CO 4	3	2	_	_	_	_	_	_	_	_	_	1
CO 5	3	2	_	_	_	_	_	_	_	_	_	1
CO 6	2	2	2	_	_	_	_	_	_	_	_	_
Where: 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)												

Textbooks:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Reference Books:

1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: DC & AC CIRCUITS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Electrical circuit elements	1	21-01-2025		TLM1	
2.	Ohm's Law and its limitations	1	23-01-2025		TLM1	
3.	KCL & KVL	1	24-01-2025		TLM1	
4.	series, parallel, series-parallel circuits	1	25-01-2025		TLM1	
5.	Problems	1	28-01-2025		TLM3	
6.	Super Position theorem	1	30-01-2025		TLM1	
7.	Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference	1	31-01-2025		TLM2	
8.	average value, RMS value, form factor, peak factor	1	01-02-2025		TLM1	
9.	RLC Circuits	1	04-02-2025		TLM1	
10.	Impedance, Power	1	06-02-2025		TLM1	
11.	Problems	1	07-02-2025		TLM3	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT – II: MACHINES AND MEASURING INSTRUMENTS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Construction, principle and operation of (i) DC Motor	1	11-02-2025		TLM2	
13.	Construction, principle and operation of (ii) DC Generator.		13-02-2025		TLM2	
14.	Single Phase Transformer	1	14-02-2025		TLM2	
15.	Three Phase Induction Motor	1	15-02-2025		TLM2	
16.	Alternators	1	18-02-2025		TLM2	
17.	Applications of electrical machines	1	20-02-2025		TLM2	
18.	Construction and working principle of Permanent Magnet Moving Coil (PMMC)	1	21-02-2025		TLM2	
19.	Moving Iron (MI) Instruments	1	22-02-2025		TLM2	
20.	Wheat Stone bridge	1	25-02-2025		TLM2	

21.	Problems	1	27-02-2025		TLM3	
No. of classes required to complete UNIT-II: 09				**No. of classes taken:**		

UNIT – III: ENERGY RESOURCES, ELECTRICITY BILL & SAFETY MEASURES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22.	Conventional and non-conventional energy resources	1	28-02-2025		TLM2	
23.	Hydel & Nuclear power generation	1	01-03-2025		TLM2	
24.	Solar & Wind power plants	1	04-03-2025		TLM2	
25.	Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc.	1	06-03-2025		TLM2	
26.	Definition of "unit" used for consumption of electrical energy, two-part electricity tariff,	1	07-03-2025		TLM2	
27.	calculation of electricity bill for domestic consumers.	1	08-03-2025		TLM2	
28.	Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits.	1	11-03-2025		TLM2	
29.	Personal safety measures: Electric Shock	1	13-03-2025		TLM2	
30.	Earthing and its types& Safety Precautions	1	14-03-2025		TLM2	
No. of classes required to complete UNIT-III: 9				**No. of classes taken:**		

UNIT – IV: SEMICONDUCTOR DEVICES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
31.	Introduction	1	18-03-2025		TLM1	
32.	Evolution of electronics – Vacuum tubes to nano electronics	1	20-03-2025		TLM2	
33.	PN Junction diode	1	21-03-2025		TLM2	
34.	Characteristics of PN Junction Diode	1	22-03-2025		TLM2	
35.	Zener Effect — Zener Diode and its Characteristics	1	25-03-2025		TLM2	
36.	Bipolar Junction Transistor	1	27-03-2025		TLM2	
37.	CB Configuration	1	28-03-2025		TLM2	
38.	CE Configuration	1	29-03-2025		TLM2	
39.	CC Configuration	1	01-04-2025		TLM2	
40.	Elementary Treatment of Small Signal CE Amplifier.	1	03-04-2025		TLM2	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT – V: BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	Introduction	1	04-04-2025		TLM1	
42.	Block diagram RPS	1	05-04-2025		TLM1	
43.	working of a full wave bridge rectifier	1	08-04-2025		TLM1	
44.	capacitor filter	1	10-04-2025		TLM1	
45.	working of simple zener voltage regulator	1	11-04-2025		TLM1	
46.	Block diagram of Public Address system	1	12-04-2025		TLM1	

47.	Circuit diagram and working of RC coupled amplifier	1	15-04-2025		TLM1	
48.	Frequency response.	1	17-04-2025		TLM1	
49.	Electronic Instrumentation	1	18-04-2025		TLM1	
50.	Block diagram of an electronic instrumentation system	1	19-04-2025		TLM1	
No. of classes required to complete UNIT-V: 10				**No. of classes taken:**		

UNIT – VI: DIGITAL ELECTRONICS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
54.	Number Systems	1	22-04-2025		TLM2	
56.	Logic gates	1	24-04-2025		TLM1	
57.	BCD & XS-3 code	1	25-04-2025		TLM2	
58.	Gray and Hamming code	1	26-04-2025		TLM1	
59.	Basic theorems & Boolean Algebra	1	29-04-2025		TLM2	
61.	Logic diagrams using logic gates only	1	01-05-2025		TLM2	
62.	Combinational Vs Sequential circuits	1	02-05-2025		TLM1	
63.	Half & Full adder	1	03-05-2025		TLM1	
65.	Introduction to sequential circuits,	1	06-05-2025		TLM1	
66.	Flip flops- SR & D	1	08-05-2025		TLM2	
67.	Flip flops- JK & T	1	09-05-2025		TLM2	
68.	Registers & counters	1	10-05-2025		TLM1	
69	**Content Beyond the Syllabus:** Op-Amp and Applications	1	13-05-2025		TLM1	
No. of classes required to complete UNIT-V: 12				**No. of classes taken:**		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II, III)	A1=5
I-Descriptive Examination (Units-I, II, III)	M1=15
I-Quiz Examination (Units-I, II, III)	Q1=10
Assignment-II (Units-IV, V, VI)	A2=5
II- Descriptive Examination (Units-IV, V, VI)	M2=15
II-Quiz Examination (Units-IV, V, VI)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
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PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty				
Signature				

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DEPARTMENT OF AEROSPACE ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: **Mr. V. V. Krishna Reddy**	
Course Name & Code	: **Introduction to Programming (23CS01)**	
L-T-P Structure	: **3-0-0**	Credits: **3**
Program/Sem/Sec	: **B.Tech./II Sem./A Sec.**	A.Y.: **2024-25**
PRE-REQUISITE	: Mathematics, Basic Computer concepts	

COURSE EDUCATIONAL OBJECTIVE (CEO):

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects

COURSE OUTCOMES (COs): At the end of the course, the student will be able to:

CO1:	Understand basics of computers, concept of algorithms and flowcharts.	Understand – L2
CO2:	Understand the features of C language.	Understand – L2
CO3:	Interpret the problem and develop an algorithm to solve it.	Apply – L3
CO4:	Implement various algorithms using the C programming language.	Apply – L3
CO5:	Develop skills required for problem-solving and optimizing the code.	Apply – L3

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-	-	-

TEXTBOOKS:

T1: The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall, 1988, Edition, 2015.

T2: Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996.

REFERENCE BOOKS:

R1: Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.

R2: Programming in C, Reema Thareja, Oxford, 2016, 2nd edition.

R3: C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad,CENGAGE, 3rd edition

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT – I: Introduction to Programming and Problem Solving

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Discussion of CEO's and CO's	1	20-01-2025		TLM1	
2.	History of Computers	1	22-01-2025		TLM1	
3.	Basic organization of a computer: ALU, input-output units.	1	24-01-2025		TLM1 TLM1	
4.	Memory, program counter	1	25-01-2025		TLM1	
5.	Introduction to Programming Languages,	1	27-01-2025		TLM1	
6.	Basics of a Computer Program-Algorithms	1	29-01-2025		TLM1	
7.	Flowcharts (Using Dia Tool), pseudo code.	1	31-01-2025		TLM1	
8.	Introduction to Compilation and Execution	1	01-02-2025		TLM1	
9.	Primitive Data Types	1	03-02-2025		TLM1	
10.	Variables, and Constants, Basic Input and Output operations	1	05-02-2025		TLM1	
11.	Type Conversion, and Casting	1	07-02-2025		TLM1	
12.	**Problem solving techniques:** Algorithmic approach, characteristics of algorithm	1	08-02-2025		TLM1	
13.	Problem solving strategies: Top-down approach, Bottom-up approach	1	10-02-2025		TLM1	
14.	Time and space complexities of algorithms.	1	12-02-2025		TLM1	
No. of classes required to complete UNIT – I: 14				**No. of classes taken:**		

UNIT – II: Control Structures

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Simple sequential programs Conditional Statements	1	14-02-2025		TLM1	
16.	if, if-else	1	15-02-2025		TLM1	
17.	Else-if ladder, nested if	1	17-02-2025		TLM1	
18.	Switch, sample programs	1	19-02-2025		TLM1	
19.	Example programs on Decision Making and Branching	1	21-02-2025		TLM1	
20.	Loops: while , Example programs	1	22-02-2025		TLM1	
21.	Loops: do-while, Example programs	1	24-02-2025		TLM1	
22.	Loops: for, Example programs	1	28-02-2025		TLM1	
23.	Break , Example programs	1	01-03-2025		TLM1	
24.	Continue, Example programs	1	03-03-2025		TLM1	
25.	Goto Example programs	1	05-03-2025		TLM1	
26.	Example programs on loops	1	07-03-2025		TLM1	
27.	Revision	1	08-03-2025		TLM1	
No. of classes required to complete UNIT – II: 13				**No. of classes taken:**		

UNIT – III: Arrays and Strings

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
28.	Arrays Introduction, Declaration	1	17-03-2025		TLM1	
29.	Array indexing, Accessing elements	1	19-03-2025		TLM1	
30.	memory model	1	21-03-2025		TLM1	
31.	programs with array of integers	1	22-03-2025		TLM1	
32.	Introduction to two dimensional arrays	1	24-03-2025		TLM1	
33.	2D Array indexing, Accessing elements	1	26-03-2025		TLM1	
34.	programs with 2D arrays	1	28-03-2025		TLM1	
35.	Introduction to Strings	1	29-03-2025		TLM1	
36.	Reading and Writing Operations on Strings	1	02-04-2025		TLM1	
37.	String Handling Functions	1	04-04-2025		TLM1	
38.	Example Programs using Strings	1	07-04-2025		TLM1	
No. of classes required to complete UNIT – III: 11				**No. of classes taken:**		

UNIT – IV: Pointers & User Defined Data types

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	Introduction to Pointers	1	09-04-2025		TLM1	
40.	dereferencing and address operators	1	11-04-2025		TLM1	
41.	pointer and address arithmetic	1	12-04-2025		TLM1	
42.	array manipulation using pointers	1	16-04-2025		TLM1	
43.	User-defined data types	1	19-04-2025		TLM1	
44.	Structures, Definition and Initialization	1	21-04-2025		TLM1	
45.	Example programs	1	23-04-2025		TLM1	
46.	Unions	1	25-04-2025		TLM1	
47.	Example programs	1	26-04-2025		TLM1	
48.	Revision	1	28-04-2025		TLM1	
No. of classes required to complete UNIT – IV: 10				**No. of classes taken:**		

UNIT – V: Functions and File Handling

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
49.	Introduction to Functions	1	30-04-2025		TLM1	
50.	Function Declaration and Definition	1	02-05-2025		TLM1	
51.	Function call Return Types Arguments	1	03-05-2025		TLM1	
52.	Recursion	1	05-05-2025		TLM1	
53.	modifying parameters inside functions using pointers	1	07-05-2025		TLM1	
54.	Storage classes examples	1	09-05-2025		TLM1	
55.	Introduction to Files	1	10-05-2025		TLM1	
56.	Basics of File Handling	1	12-05-2025		TLM1	
57.	Basics of File Handling examples	1	14-05-2025		TLM1	
58.	Operations on Files examples	1	16-05-2025		TLM1	
No. of classes required to complete UNIT – V: 10				**No. of classes taken:**		

Content Beyond the Syllabus:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
59.	Number based real time problems	1	17-05-2025		TLM1	
60.	Control structures real time problems	1	17-05-2025		TLM1	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Assignment – I (Units-I, II)	A1 = 5
I – Descriptive Examination (Units-I, II)	M1 = 15
I – Quiz Examination (Units-I, II)	Q1 = 10
Assignment – II (Unit-III, IV & V)	A2 = 5
II – Descriptive Examination (UNIT-III, IV & V)	M2 = 15
II – Quiz Examination (UNIT-III, IV & V)	Q2 = 10
Mid Marks = 80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data andsynthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge toassess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a memberand leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning**: Recognize the need for and have the preparation and ability to engaging independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1	To apply the knowledge of Aerodynamics, Propulsion, Aircraft structures and Flight Dynamics in Aerospace vehicle design.
PSO2	To prepare the students to work effectively in Aerospace and Allied Engineering organizations.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. V.V. Krishna Reddy**	**Dr. K. Venkata Rao**	**Dr. K. Phaneendra**	**Dr. B. Srinivas Rao**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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An ISO 21001:2018, 500001:2018, 14001:2015 Certified Institution
DEPARTMENT OF AEROSPACE ENGINEERING
Estd.: 1998 Website: https://www.lbrce.ac.in/ase/index.php Email: hodaero@lbrce.ac.in Phone:08659-222933 Ext:624/623

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. I. Dakshina Murthy
Course Name & Code : Engineering Mechanics & 20ME02
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem : B. Tech / II-Sem **A.Y.:** 2024-25

PREREQUISITE: Engineering Physics, Mathematics

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To get familiarized with different types of force systems.
- To draw accurate free body diagrams representing forces and moments acting on body to analyze equilibrium of system of forces.
- To teach the basic principles of center of gravity, centroid and moment of inertia and determine them for different simple and composite bodies.
- To apply the Work energy method to particle motion
- To Understand the kinematics and kinetics if translational and rotational motion of rigid bodies.

COURSE OUTCOMES (COs): On Completion of the course, student should be able to

CO1	Determine the resultant of coplanar concurrent and non-concurrent force systems. (**Apply-L3**).
CO2	Apply the Static equilibrium conditions to determine unknown planar force systems and determine the frictional forces for the bodies in contact. (**Apply-L3**).
CO3	Calculate the centroids, center of gravity and moment of inertia ofgeometrical shapes (**Apply-L3**).
CO4	Apply the principles of work energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle. (**Apply-L3**).
CO5	Solve the problems involving the translational and rotational motion of rigid bodies. (**Apply-L3**)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1												3
CO2	3	3	2	1											3
CO3	3	2		2											3
CO4	2	3		2											3
CO5	3	3		1											3
1 - Low			**2 –**Medium							**3 -** High					

TEXTBOOKS:

T1 S. S. Bhavikatti, Engineering Mechanics, 4thedition, New Age International (P) Ltd,2012.
T2 N. H. Dubey, Engineering Mechanics, McGraw Hill, 2013

REFERENCE BOOKS:

R1 Ferdinand. L. Singer, Engineering Mechanics, 3rd edition, Harper – Collins, 1994
R2 B.Bhattacharya, Engineering Mechanics, 1stedition, Oxford University Press, 2008
R3 A.K.Tayal, Engineering Mechanics, 14thedition, 2ndreprint, Umesh Publications, 2012
R4 R.K.Bansal, Engineering Mechanics, 3rd edition, Laxmi Publications, 2016
R5 R.K.Rajput, A Text book of Applied Mechanics, Laxmi Publications, 2011.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: INTRODUCTION TO ENGINEEIRNG MECHANICS AND SYSTEM OF FORCES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Engineering Mechanics	1	14-01-2025		TLM1	
2.	Course objectives, Outcomes, CEOs, POs, PEOs	1	15-01-2025		TLM1	
3.	Basic Terminology in Mechanics	1	16-01-2025		TLM 1	
4.	Laws of Mechanics - Parallelogram, Triangle and Polygon Law of Forces	1	18-01-2025		TLM 1	
5.	Force, Characteristics of Forces, Force Systems & types of force systems	1	21-01-2025 22-01-2025		TLM1	
6.	Resolution and Composition of forces, Resultant of Coplanar Concurrent ForceSystem-Problems	1	23-01-2025		TLM1	
7.	Moment of a Force, Couple – Varignon's Theorem	1	25-01-2025		TLM1	
8.	**Tutorial-1**	1	28-01-2025		TLM3	
9.	Resultant of Coplanar Non-Concurrent ForceSystem-Problems	2	29-01-2025 30-01-2025		TLM 1	
10.	Resultant of Coplanar Non-Concurrent Force System-Problems	2	01-02-2025 04-02-2025		TLM1,2	
No. of classes required to complete UNIT-I: 10				**No. of classes taken:**		

UNIT-II: EQUILIBRIUM OF SYSTEM OF FORCES & FRICTION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	**EQUILIBRIUM OF SYSTEM OF FORCES**: Equilibrium equations of concurrent and non concurrent force system, Free Body Diagrams,Lami's Theorem	1	05-02-2025		TLM1	
12.	Equations of Equilibrium of Coplanar Systems, Conditions of Equilibrium - Problems	2	06-02-2025 11-02-2025		TLM1	
13.	**Tutorial-2**	1	12-02-2025		TLM 3	
14.	Analysis of Plane Trusses	1	13-02-2025		TLM1	
15.	Principles of Virtual work with simple examples	1	15-02-2025		TLM1	
16.	**FRICTION:** Introduction to Friction, advantages, disadvantages	1	18-02-2025		TLM1, 2	
17.	Laws of Friction, Co-efficient of Friction, Angle of Friction –Angle of Repose	1	19-02-2025		TLM1	
18.	Blocks resting on horizontal plane - Problems	2	20-02-2025 22-02-2025		TLM1	
19.	Blocks resting on Inclined plane - Problems	2	25-02-2025 26-02-2025		TLM1	
20.	Ladder Friction - Problems	2	27-02-2025 01-03-2025		TLM1	
21.	Revision of Unit - 1	1	04-03-2025		TLM1	
22.	Revision of Unit - 2	1	05-03-2025		TLM1	
23.	Assignment -II	1	06-03-2025		------	
No. of classes required to complete UNIT-II: 10				**No. of classes taken:**		

UNIT-III: CENTROID AND AREA MOMENT OF INERTIA; CENTRE OF GRAVITY AND MASS MOMENT OF INERTIA

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
24.	**CENTROID:** Introduction**,** Concept, Applications, axis of symmetry	1	18-03-2025		TLM2	
25.	Centroid of simple figures from basic principles Centroid of simple composite sections	1	19-03-2025		TLM1,2	
26.	**AREA MOMENT OF INERTIA:** Moment of inertia, Theorems of Moment of Inertia	1	20-03-2025		TLM2	
27.	Determination of Moment of Inertia of Rectangle, Circle, Hollow Circle	1	22-03-2025		TLM2	
28.	Determination of Moment of Inertia of SemiCircle, Triangle from basic principles	1	25-03-2025		TLM2	
29.	Problems on moment of inertia	1	26-03-2025		TLM2	
30.	Problems on Area moment of inertia	1	27-03-2025		TLM1	
31.	**CENTRE OF GRAVITY**: Centre of gravity ofsolid cylinder	1	29-03-2025		TLM3	
32.	Centre of gravity of right circular cone, hemi sphere	1	01-04-2025		TLM1	
33.	Centre of gravity of composite bodies	1	02-04-2025		TLM1	
34.	**MASS MOMENT OF INERTIA:** Introduction**,**Radius of gyration	1	03-04-2025		TLM2	
35.	Determination of Mass Moment of Inertia of Uniform Rod, Rectangular Plate, Circular Plate-problems	1	05-04-2025		TLM1,2	
36.	Determination of Mass Moment of Inertia of Solid Sphere, Solid Cylinder--problems	1	08-04-2025		TLM1,2	
No. of classes required to complete UNIT-III: 13				**No. of classes taken:**		

UNIT-IV: RECTILINEAR AND CURVILINEAR MOTION OF A PARTICLE

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Introduction to Kinematics, **g**eneral principles in dynamics, types of motion, rectilinear motion	1	09-04-2025		TLM1,2	
38.	Motion with Uniform Velocity - Problems	1	10-04-2025		TLM1,2	
39.	Motion with Uniform Acceleration derivations- problems	1	15-04-2025		TLM1,2	
40.	**Tutorial-6**	1	16-04-2025		TLM1,2	
41.	Motion with Uniform Acceleration-Problems	1	17-04-2025		TLM3	
42.	Motion with varying acceleration - Problems	1	19-04-2025		TLM2	
43.	D-Alembert's principle –	1	22-04-2025		TLM2	
44.	Work Energy method and applications to particle Impulse momentum method	1	23-04-2025		TLM1,2	

45.	**Tutorial-7 &** Assignment -III/ Quiz-III	1	24-04-2025		TLM3	
46.	Uniformly accelerated rotation-problems	1	26-04-2025		TLM1,2	
47.	Unit-IV Revision	1	29-04-2025		TLM1	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: RIGID BODY MOTION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
48.	Introduction to Kinematics and kinetics of rigid bodies in translation	1	01-05-2025		TLM1,2	
49.	Kinetics of rigid bodies Rotating about Fixed Axis, Derivations	1	03-05-2025		TLM1,2	
50.	**Tutorial-8**	1	06-05-2025		TLM3	
51.	Work Energy method	1	07-05-2025		TLM1,2	
52.	Impulse momentum method	1	08-05-2025		TLM2	
53.	Simple Applications	1	13-05-2025		TLM1,2	
54.	**Tutorial-9**	1	14-05-2025		TLM1,3	
55.	Fixed rotation of bodies, Assignment -V/ Quiz-V	1	15-05-2025		TLM3	
No. of classes required to complete UNIT-V: 8				**No. of classes taken:**		

SYLLABUS BEYOND SYLLABUS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
No. of classes required to complete :				**No. of classes taken:**		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering Problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, Natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the Engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the knowledge of Aerodynamics, Propulsion, Aircraft structures and Flight Dynamics in the Aerospace vehicle design
PSO 2	To prepare the students to work effectively in Aerospace and Allied Engineering organizations

Title	**Course Instructor**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mr. I. Dakshina Murthy	Mr. J. SUBBA REDDY	Dr. P. Lovaraju
Signature			

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I), ISO 21001:2018 Certified Institution

Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada

L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.

Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF FRESHMAN ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor **:** Dr. Mallikharjuna Rao Darla
Course Name & Code **:** Engineering Chemistry Lab & 23FE54
L-T-P Structure **: 0-0-3** **Credits: 1.5**
Program/Sem/Sec : B. Tech./ Sem-II/ASE **A.Y. :** 2024-25

Pre requisites: Nil

Course Educational Objective:

- To enable the students to perform different types of volumetric titrations.
- It provides an overview of preparation of polymers, nanomaterials and analytical techniques.

Course Outcomes: After completion of the course, the students will be able to,

CO1: Analyze important parameters of water to check its suitability for drinking purpose and industrial applications. (**Analyze)**

CO2: Acquire practical knowledge related to preparation of Bakelite and nanomaterials. **(Apply)**

CO3: Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus. **(Understand)**

CO4: To estimate the amount of calcium in cement and the strength of acid present in Pb-Acid battery. (**Apply**)

CO5: Improve individual / teamwork skills, communication and report writing skills with ethical values. (**Apply**)

POs / COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	1	2	-	-	-	-	-
CO2	3	-	1	-	-	2	1	-	-	-	-	-
CO3	3	2	1	-	-	-	2	-	-	-	-	-
CO4	3	1	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	2	-	-	-	-	-	-	-
1 = Slight (Low)			**2 = Moderate (Medium)**				**3 = Substantial (High)**					

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial(High).

BoS Approved Lab Manual

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): ASE

S.No.	Experiment	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	HOD Sign Weekly
1.	Introduction to Engineeringchemistry lab COs and POs	3	23-01-2025 & 30-01-2025		TLM1		
2.	Preparation of a Bakelite	3	06-02-2025		TLM4	CO1	
3.	Determination of amount of HCl using standard Na_2CO_3 solution	3	13-02-2025		TLM4	CO1	
4.	Determination of Strength of an acid in Pb-Acid battery	3	20-02-2025		TLM4	CO1	
5.	Estimation of Ferrous Iron by Dichrometry	3	27-02-2025		TLM4	CO1	
6.	Estimation of Ferrous Iron by Permanganometry	3	06-03-2025		TLM4	CO1	
7.	Determination of hardness of a groundwater sample.	3	20-03-2025		TLM4	CO1	
8.	Determination of calorific value of gases by Junker's gas calorimeter.	3	27-03-2025		TLM4	CO1	
9.	Determination of viscosity of lubricating oil by Redwood Viscometer-1 &2	3	03-03-2025		TLM4	CO2	
10.	Preparation of nanomaterials by precipitation method	3	10-04-2025		TLM4	CO5	
11.	Additional experiment/repeat	3	17-04-2025		TLM4	CO1	
12.	Additional experiment/repeat	3	24-04-2025		TLM4	CO1	
13.	Additional experiment/repeat	3	01-04-2025		TLM4	CO1	
14.	Additional experiment/repeat	3	08-05-2025		TLM4	CO1	
16.	Internal Exam	3	15-05-2025		TLM4		
	Total						

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/ Swayam Prabha / MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Part - C

EVALUATION PROCESS:

According to Academic Regulations of R23 Distribution and Weightage of Marks for Laboratory Courses is as follows.

(a) Continuous Internal Evaluation(CIE):

- ✓ The continuous internal evaluation for laboratory course is based on the following parameters:

Evaluation Task	Marks
Day-to-Day Work	A1 = 10
Record & Observation	B1 = 5
Internal Exam	C1 = 15
Cumulative Internal Examination (CIE): (A1+B1+C1)	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in

	diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. Mallikharjuna Rao D**	**Dr.V.Parvathi**	**Dr.V.Parvathi**	**Dr.A.Rami Reddy**
Signature				

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.T.SATYANARAYANA/ Mr.R.ANJANEYULU NAIK
Course Name & Code : ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP & 23EE51
L-T-P Structure : **0-0-3** **Credits: 1.5**
Program/Branch/Sem/Sec: B.Tech/ASE, II SEM **A.Y.:** 2024-25

Course Educational Objective: To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Compute voltage, current and power in an electrical circuit. **(Apply)**
CO2	Compute medium resistance using Wheat stone bridge. **(Apply)**
CO3	Discover critical field resistance and critical speed of DC shunt generators. **(Apply)**
CO4	Estimate reactive power and power factor in electrical loads. **(Understand)**
CO5	Plot the characteristics of semiconductor devices. **(Apply)**
CO6	Demonstrate the working of various logic gates using ICs. **(Understand)**

COURSE ARTICULATION MATRIX (Correlation between COs & POs):

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12
CO1	3	2						2	3	2		1
CO2	2	2		2				2	2	2		
CO3	2	2	2	2				2	2	2		
CO4	2	2		3				2	3	2		1
CO5	3	2			2			2	2	2	1	1
CO6	3	3		2	2			2	3	3		1
1 - Low **2 –Medium** **3 - High**												

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): ELECTRICAL ENGINEERING

S.No.	Topics to be covered. (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to BEEE Lab , Importance of Electrical Lab, its Objectives and Outcomes, BASIC MEASURING METERS, SAFETY PRECUATIONS & Other suggestions.	3	20-01-2025		TLM4	
2.	Verification of KCL and KVL	3	27-01-2025		TLM4	
3.	Verification of Superposition theorem	3	03-02-2025		TLM4	
4.	Measurement of Resistance using Wheat stone bridge	3	03-02-2025		TLM4	
5.	Magnetization Characteristics of DC shunt Generator	3	10-02-2025		TLM4	
6.	Measurement of Power and Power factor using Single-phase wattmeter	3	17-02-2025		TLM4	
7.	Calculation of Electrical Energy for Domestic Premises	3	24-02-2025		TLM4	
8.	Internal Lab Examination (**Electrical**)	3	03-03-2025		TLM4	
No. of classes required: 21				**No. of classes taken:**		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Expt. no's**	**Marks**
Day to Day work	1,2,3,4,5,6,7,8…	A1 =10
Record and observation	1,2,3,4,5,6,7,8…	B1 = 5
Internal Exam	1,2,3,4,5,6,7,8…	**C1=15**
Cumulative Internal Examination (CIE):(A1+B1+C1)	1,2,3,4,5,6,7,8…	**30**
Semester End Examination (SEE)	1,2,3,4,5,6,7,8…	**70**
Total Marks=CIE+SEE		**100**

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
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PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Date: 20-01-2025

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	R.A.NAIK	**Dr. A.V.G.A.MARTHANDA**	**Dr.G.NAGESWARA RAO**	**Dr.J.S.V.PRASAD**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(An Autonomous Institution since 2010)
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An ISO 21001:2018, 14001:2015, 50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
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DEPARTMENT OF AEROSPACE ENGINEERING

COURSEHANDOUT
PART-A

Name of The Course Instructor : **Mr. V. V. Krishna Reddy**

Course Name & Code : **Computer Programming Lab (23CS51)**

L-T-P Structure : **0-0-3** Credits:**1.5**

Program/Sem/Sec : **B.Tech., ASE/ II Sem/ A Sec.** A.Y. :**2024-25**

PRE-REQUISITE: Mathematics, Basic Computer Terminology

COURSE EDUCATIONAL OBJECTIVE (CEO): The course aims to give students hands –on experience and train them on the concepts of the C- programming language.

COURSEOUTCOMES(COs): At the end of the course, the student will be able to:

CO1:	Read, understand, and trace the execution of programs written in C language.	Understand – L2
CO2:	Apply the right control structure for solving the problem.	Apply – L3
CO3:	Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, pointers and files in C.	Apply – L3
CO4:	Improve individual / teamwork skills, communication and report writing skills with ethical values.	

COURSEARTICULATIONMATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	3	-	-	-	-	-	-	-	-	-
CO2	3	2	2	-	3	-	-	-	-	-	-	-	-	-
CO3	3	2	2	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	2	2	2	2	-	-

PART-B

COURSEDELIVERYPLAN (LESSONPLAN):

S. No.	Programs to be covered	No. of Classes		Actual Date of Completion	Delivery Method	HOD Sign.
		Required as per the Schedule	Tentative Date of Completion			
1.	**Week1:** Familiarization with programming environment	03	24-01-2025		TLM4	
2.	**Week2:** Problem-solving using Algorithms and Flow charts.	03	31-01-2025		TLM4	
3.	**Week3:** Exercise Programs on Variable types and type conversions	03	07-02-2025		TLM4	
4.	**Week4:** Exercise Programs on Operators and the precedence and as associativity.	03	14-02-2025		TLM4	
5.	**Week5:** Exercise Programs on Branching and logical expressions	03	21-02-2025		TLM4	
6.	**Week6:** Exercise Programs on Loops, while and for loops	03	28-02-2025		TLM4	
7.	**Week7:** Exercise Programs on 1 D Arrays & searching.	03	07-03-2025		TLM4	
8.	**Week8:** Exercise Programs on 2-D arrays, sorting and Strings.	03	21-03-2025		TLM4	
9.	**Week9:** Exercise Programs on Pointers, structures and dynamic memory allocation	03	28-03-2025		TLM4	
10.	**Week10:** Exercise Programs on Bit fields, Self-Referential Structures, Linked lists	03	04-04-2025		TLM4	
11.	**Week 11:** Exercise Programs on Functions, call by value, scope and extent.	03	11-04-2025		TLM4	
12.	**Week 12:** Exercise Programs on Recursion, the structure of recursive calls	03	25-04-2025		TLM4	
13.	**Week 13:** Exercise Programs on Call by reference, dangling pointers	03	02-05-2025		TLM4	
14.	**Week 14:** Exercise Programs on File handling.	03	09-05-2025		TLM4	
15.	Lab Internal Test	03	16-05-2025		TLM4	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Day to Day Work:	15
Internal Test	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO12	**Life-long learning**: Recognize the need for and have the preparation and ability to engaging independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1	To apply the knowledge of Aerodynamics, Propulsion, Aircraft structures and Flight Dynamics in Aerospace vehicle design.
PSO2	To prepare the students to work effectively in Aerospace and Allied Engineering organizations.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. V. V. Krishna Reddy**	**Dr. K. Venkata Rao**	**Dr. K. Phaneendra**	**Dr. B. Srinivas Rao**
Signature				

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Estd.: 1998 Website: https://www.lbrce.ac.in/ase/index.php Email: hodaero@lbrce.ac.in Phone:08659-222933 Ext:624/623

COURSE HANDOUT

PART-A

Name of Course Instructor(s): Mr I.DAKSHINA MURTHY/B.UDAYA LAKSHMI,

Course Name & Code	**:** Engineering Mechanics Lab & 23ME52	**Regulation**	: R23
L-T-P Structure	**: 0-0-3 – 1 ½**	**Credits**	**:** 01 ½
Program/Sem/Sec	: B.Tech – II Semester – A Section	**A.Y.**	**:** 2024-25
Continuous Internal Assessment	**: 30**	**Semester End Examination**	**: 70**

PREREQUISITE: Engineering Mechanics, Engineering Physics

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The students completing the course are expected to:

- Verify the Law of Parallelogram and Triangle of Forces.
- Determine the coefficients of friction of Static and Rolling friction and Centre of gravity of different plane Lamina.
- Analyze the system of Pulleys and Moment of Inertia of Compound Pendulum and Flywheel.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller. (**Applying - L3**)
CO2	Verify the Law of Polygon of Forces and Law of Moment using force polygon and bell crank lever. **(Applying - L3)**
CO3	Determine the Centre of gravity and Moment of Inertia of different configurations. **(Applying - L3)**
CO4	Apply the equilibrium conditions of a rigid body under the action of different force systems. **(Applying - L3)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1					3	3						2	1	3	3
CO2	3				3	2						2		2	2
CO3	3				3							2			
CO4	3				3							2		2	2
1 - Low					**2** –Medium							**3** - High			

REFERENCES

References:

1. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGraw Hill Education.
2. Hibbeler R.C., Engineering Mechanics: Statics and Dynamics, 14th Edition, Pearson Education, Inc., New Delhi, 2022
3. Engineering Mechanics Lab Manual

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): (B. Tech – II Semester - Section – A) (R 23)

Schedule of the lab: Every Monday (from 09.50 AM – 12.30 PM)

Batch size:

S.No	Batches	Regd. Nos	Total No. of Students
01	Section A	23761A5601 – 332, 333 – 364	64

Division of Batches:

Batch No	Regd. No of students	Batch size
A1	23761A5601 – 306	06
A2	23761A5607 – 313	06
A3	23761A5614 – 320	06
A4	23761A5621 – 326	06
A5	23761A5627 – 334	06

Batch No	Regd. No of students	Batch size
A6	23761A5635 – 341	06
A7	23761A5642 – 347	06
A8	23761A5648 – 353	06
A9	23761A5654 – 359	06
A10	23761A5660 – 364	05

List of Experiments:

1. Verification of Law of Parallelogram of Forces. (Ex 1)
2. Verification of Law of Triangle of Forces. (Ex 2)
3. Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table. (Ex 3)
4. Determination of coefficient of Static and Rolling Frictions (Ex 4)
5. Determination of Centre of Gravity of different shaped Plane Lamina. (Ex 5)
6. Verification of the conditions of equilibrium of a rigid body under the action of coplanar non-concurrent, parallel force system with the help of a simply supported beam. (Ex 6)
7. Study of the systems of pulleys and draw the free body diagram of the system. (Ex 7)
8. Determine the acceleration due to gravity using a compound pendulum. (Ex 8)
9. Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to the plane of oscillation and passing through its centre of mass. (Ex 9)
10. Determine the Moment of Inertia of a Flywheel. (Ex 10)
11. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever. (Ex 11)
12. Verification of Work Energy and Impulse Momentum methods. (Ex 12)

Division of Cycles:

S. No.	Topics to be covered (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
01	Introduction to Engineering Mechanics Lab, Demonstration of all experiments, CEOs, and COs of the Laboratory	3	**21-01-2025**		TLM4	
Cycle-I (Each batch will perform the experiments according to the academic calendar and the schedule) The batch A1 schedule is shown as an example here						
02	Verification of Law of Parallelogram of Forces	3	**28-1-2025**		TLM4	
03	Verification of Law of Triangle of Forces	3	**4-2-2025**		TLM4	
04	Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table	3	**11-2-2025**		TLM4	
05	Determination of coefficient of Static and Rolling Frictions	3	**18-2-2025**		TLM4	
06	Determination of Centre of Gravity of different shaped Plane Lamina	3	**25-2-2025**		TLM4	
07	Verification of the conditions of equilibrium of a rigid body under the action of coplanar non-concurrent, parallel force system with the help of a simply supported beam	3	**4-3-2025**		TLM4	
I Mid Exams: 10-3-2025 TO 15-3-2025						
Cycle II (Each batch will perform the experiments according to the academic calendar and the schedule) The batch A1 schedule is shown as an example here						
08	Study of the systems of pulleys and draw the free-body diagram of the system	3	**18-03-2025**		TLM4	
09	Determine the acceleration due to gravity using a compound pendulum	3	**25-3-2025**		TLM4	
10	Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to the plane of oscillation and passing through its centre of mass	3	**1-4-2025**		TLM4	
11	Determine the Moment of Inertia of a Flywheel	3	**8-4-2025**		TLM4	
12	Verification of the Law of Moment using Rotation Disc Apparatus and Bell Crank Lever	3	**15-4-2025**		TLM4	
13	Verification of Work Energy and Impulse Momentum methods	3	**22-4-2025**		TLM4	
14	REPITION LAB	3	**29-4-2025**			
15	Internal Exam and Viva - Voce	3	**6-5-2025**		TLM4	
II Mid Exams: 02-06-2025 to 7-06-2025						

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

ACADEMIC CALENDAR

Commencement of II Semester Classwork	**13-01-2025**		
Description	**From**	**To**	**Weeks**
I Phase of Instructions	13-1-2025	8-3-2025	8 Weeks
I Mid Examinations	10-3-2025	15-3-2025	1 Week
II Phase of Instructions	17-3-2025	17-5-2025	8 Weeks
II Mid Examinations	2-6-2025	7-6-2025	1 Week
Preparation and Practicals	9-6-2025	14-6-2025	1 Week
Semester End Examinations	16-6-2025	28-6-2025	1 Week
Commencement of III Semester Classwork	**30-6-2025**		

Schedule of Experiments:

Date	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
21-01-2025	Introduction to Engineering Mechanics Lab									
28-1-2025	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8	Ex 9	Ex 10
4-2-2025	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8	Ex 9	Ex 10	Ex 1
11-2-2025	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8	Ex 9	Ex 10	Ex 1	Ex 2
18-2-2025	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8	Ex 9	Ex 10	Ex 1	Ex 2	Ex 3
25-2-2025	Ex 5	Ex 6	Ex 7	Ex 8	Ex 9	Ex 10	Ex 1	Ex 2	Ex 3	Ex 4
4-3-2025	Ex 6	Ex 7	Ex 8	Ex 9	Ex 10	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5
18-03-2025	Ex 7	Ex 8	Ex 9	Ex 10	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6
25-3-2025	Ex 8	Ex 9	Ex 10	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7
1-4-2025	Ex 9	Ex 10	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8
8-4-2025	Ex 10	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8	Ex 9
15-4-2025	Ex 11	Ex 11	Ex 11	Ex 11	Ex 11	Ex 11	Ex 11	Ex 11	Ex 11	Ex 11
22-4-2025	Ex 12	Ex 12	Ex 12	Ex 12	Ex 12	Ex 12	Ex 12	Ex 12	Ex 12	Ex 12
29-4-2025	REPITITION LAB									
6-5-2025	Internal Exam and Viva - Voce									

Lab Occupancy Time Table (B.Tech II Sem: Section – A/ S)

↓Day/Date→	09.00 –	10.00 -	11.00 -	12.00 -	1.00 -2.00	2.00 – 3.00	3.00 -4.00
Monday				LUNCH			
Tuesday					EM LAB		
Wednesday							
Thursday							
Friday							
Saturday							

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Expt. no's	Marks
Day to Day work = **A**	1,2,3,4,5,6,7,8…	A = 10
Record = **B**	1,2,3,4,5,6,7,8	B = 05
Internal Test / Viva = **C**	1,2,3,4,5,6,7,8	C = 15
Cumulative Internal Examination: A + B + C = 30	1,2,3,4,5,6,7,8	**30**
Semester End Examinations = D **Procedure: 20 M; Experimental Work & Results: 30 M; Viva – Voce: 20 M**	1,2,3,4,5,6,7,8	**D = 70**
Total Marks: A + B + C + D = 100	1,2,3,4,5,6,7,8	**100**

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	To build a professional career and pursue higher studies with sound knowledge in Mathematics, Science and Mechanical Engineering.
PEO 2	To inculcate strong ethical values and leadership qualities for graduates to become successful in multidisciplinary activities.
PEO 3	To develop inquisitiveness towards good communication and lifelong learning.

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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Title	Course Instructor	Module Coordinator	Head of the Department
Name of the Faculty			
Signature			