LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
Accredited by NAAC with "A" Grade & NBA for ASE, CE, CSE, ECE, EEE, ME & IT (Under Tier - I)
An ISO 21001:2018, 14001:2015, 50001:2018 Certified Institution
Approved by AICTE, New Delhi and Permanently Affiliated to JNTUK, Kakinada
L.B. Reddy Nagar, Mylavaram, NTR Dist., Andhra Pradesh-521 230.
Phone: 08659-222933, **Fax**: 08659-222931
FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:** I B. Tech., II-Sem., AI & ML A
ACADEMIC YEAR	**:** 2025-26
COURSE NAME & CODE	**:** Differential Equations & Vector Calculus
L-T-P STRUCTURE	**:** 3-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**:** Dr. K. Bhanu Lakshmi
COURSE COORDINATOR	**:** Dr. K. Jhansi Rani
PRE-REQUISITES	**:** Basics of Vectors**,** Differentiation, Integration

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To enlighten the learners in the concept of differential equations and multi-variable 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	02-02-2026		TLM2			
2.	Course Outcomes, Program Outcomes	1	03-02-2026		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	04-02-2026		TLM1	CO1	T1,T2	
4.	Linear Differential equation	1	06-02-2026		TLM1	CO1	T1,T2	
5.	Bernoulli's DE	1	09-02-2026		TLM1	CO1	T1,T2	
6.	Exact DE	1	10-02-2026		TLM1	CO1	T1,T2	
7.	Exact DE	1	11-02-2026		TLM1	CO1	T1,T2	
8.	Non-exact DE Type I	1	12-02-2026		TLM1	CO1	T1,T2	
9.	Non-exact DE Type II	1	13-02-2026		TLM1	CO1	T1,T2	
10.	Non-exact DE Type III	1	16-02-2026		TLM1	CO1	T1,T2	
11.	Non-exact DE Type IV	1	17-02-2026		TLM1	CO1	T1,T2	
12.	Newton's Law of cooling	1	18-02-2026		TLM1	CO1	T1,T2	
13.	Newton's Law of cooling	1	02-02-2026		TLM1	CO1	T1,T2	
14.	Law of natural growth and decay	1	19-02-2026		TLM1	CO1	T1,T2	
15.	Law of natural growth and decay	1	20-02-2026		TLM1	CO1	T1,T2	
16.	Electrical circuits	1	23-02-2026		TLM1	CO1	T1,T2	
17.	TUTORIAL - I	1	24-02-2026		TLM3	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
18.	Introduction to UNIT II	1	25-02-2026		TLM1	CO1	T1,T2	
19.	Solving a homogeneous DE	1	26-02-2026		TLM1	CO1	T1,T2	
20.	Solving a homogeneous DE	1	27-02-2026		TLM1	CO1	T1,T2	
21.	Finding Particular Integral, P.I for e^{ax+b}	1	02-03-2026		TLM1	CO1	T1,T2	
22.	P.I for Cos bx, or sin bx	1	04-03-2026		TLM1	CO1	T1,T2	
23.	P.I for polynomial function	1	05-03-2026		TLM1	CO1	T1,T2	
24.	P.I for $e^{ax+b}v(x)$	1	06-03-2026		TLM1	CO1	T1,T2	

25.	P.I for $x^k v(x)$	1	09-03-2026		TLM1	CO1	T1,T2	
26.	Method of Variation of parameters	1	10-03-2026		TLM1	CO1	T1,T2	
27.	Method of Variation of parameters	1	11-03-2026		TLM1	CO1	T1,T2	
28.	Simultaneous linear equations	1	12-03-2026		TLM1	CO1	T1,T2	
29.	Simultaneous linear equations	1	13-03-2026		TLM1	CO1	T1,T2	
30.	L-C-R circuits	1	16-03-2026		TLM1	CO1	T1,T2	
31.	Simple Harmonic motion	1	17-03-2026		TLM1	CO1	T1,T2	
32.	TUTORIAL - II	1	18-03-2026		TLM3	CO1	T1,T2	
33.	Revision	1	20-03-2026		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-II		15			No. of classes taken:			

I MID EXAMINATIONS (23-03-2026 TO 28-03-2026)

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
34.	Introduction to Unit III	1	30-03-2026		TLM1	CO2	T1,T2	
35.	Formation of PDE by elimination of arbitrary constants	1	31-03-2026		TLM1	CO2	T1,T2	
36.	Formation of PDE by elimination of arbitrary functions	1	01-04-2026		TLM1	CO2	T1,T2	
37.	Formation of PDE by elimination of arbitrary functions	1	02-04-2026		TLM1	CO2	T1,T2	
38.	Solving of PDE	1	06-04-2026		TLM1	CO2	T1,T2	
39.	Lagrange's Method	1	07-04-2026		TLM1	CO2	T1,T2	
40.	Lagrange's Method	1	08-04-2026		TLM1	CO2	T1,T2	
41.	Homogeneous Linear PDE with constant coefficients	1	09-04-2026		TLM1	CO2	T1,T2	
42.	TUTORIAL - III	1	10-04-2026		TLM3	CO2	T1,T2	
No. of classes required to complete UNIT-III		09			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
43.	Introduction to UNIT IV	1	13-04-2026		TLM1	CO3	T1,T2	
44.	Vector Differentiation	1	15-04-2026		TLM1	CO3	T1,T2	
45.	Gradient	1	16-04-2026		TLM1	CO3	T1,T2	
46.	Directional Derivative	1	17-04-2026		TLM1	CO3	T1,T2	
47.	Directional Derivative	1	20-04-2026		TLM1	CO3	T1,T2	

48.	Divergence	1	21-04-2026		TLM1	CO3	T1,T2	
49.	Curl	1	22-04-2026		TLM1	CO3	T1,T2	
50.	Problems	1	23-04-2026		TLM1	CO3	T1,T2	
51.	Solenoidal fields, Irrotational fields, potential surfaces	1	24-04-2026		TLM1	CO3	T1,T2	
52.	Solenoidal fields, Irrotational fields, potential surfaces	1	27-04-2026		TLM1	CO3	T1,T2	
53.	Laplacian, second order operators	1	28-04-2026		TLM1	CO3	T1,T2	
54.	Vector Identities	1	29-04-2026		TLM1	CO3	T1,T2	
55.	Vector Identities	1	30-04-2026		TLM1	CO3	T1,T2	
56.	TUTORIAL IV	1	01-05-2026		TLM3	CO3	T1,T2	
No. of classes required to complete UNIT-IV		14			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
57.	Introduction to Unit-V	1	04-05-2026		TLM1	CO4	T1,T2	
58.	Line Integral	1	05-05-2026		TLM1	CO4	T1,T2	
59.	Circulation	1	06-05-2026		TLM1	CO4	T1,T2	
60.	Work done	1	07-05-2026		TLM1	CO4	T1,T2	
61.	Surface Integral	1	08-05-2026		TLM1	CO4	T1,T2	
62.	Surface Integral	1	11-05-2026		TLM1	CO4	T1,T2	
63.	Flux	1	13-05-2026		TLM1	CO4	T1,T2	
64.	Green's Theorem	1	14-05-2026		TLM1	CO4	T1,T2	
65.	Green's Theorem	1	15-05-2026		TLM1	CO4	T1,T2	
66.	Stoke's Thoerem	3	01-06-2026 02-06-2026 03-06-2026		TLM1	CO4	T1,T2	
67.	Divergence Theorem	3	04-06-2026 05-06-2026 08-06-2026		TLM1	CO4	T1,T2	
68.	TUTORIAL - V	1	09-06-2026		TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-V		16			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
69.	Non-homogeneous Linear PDE with constant coefficients	3	10-06-2026 11-06-2026 12-06-2026		TLM2	CO2	T1,T2	
No. of classes		3			No. of classes taken:			
II MID EXAMINATIONS (03-06-2024 TO 08-06-2024)								

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. K. Bhanu Lakshmi	**Dr. K. Jhansi Rani**	**Dr. A. RAMI REDDY**	**Dr. T. Satyanarayana**
Course Instructor	Course Coordinator	Module Coordinator	HOD

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Phone: 08659-222933, **Fax**: 08659-222931

DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. B. Rambabu **Date**: 02-02-2026

Course Name & Code **:** Basic Electrical & Electronics Engineering – 23EE01

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

Program/Sem./Sec. : B.Tech/I/CSE(AI&ML)-A Sec **A.Y.:** 2023-24

Regulations: R23

PREREQUISITE: Physics

Course Objectives (COs)

Basic Electrical Engineering:

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.

Basic Electronics Engineering

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: BASIC ELECTRICAL ENGINEERING	
CO1	Extract electrical variables of AC & DC circuits using 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 systems. **(Understand)**
PART-B: BASIC ELECTRONICS ENGINEERING	
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)**

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3									1	3	2		2
CO2	2	2												2		3
CO3	2	2				3					2	2	2			
CO4	3	2										1	2		3	2
CO5	3	2										1	2		3	2
CO6	2	2	2										2		2	1
1 - Low **2 –**Medium **3 -** 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

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

REFERENCE BOOKS:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020
3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017
4. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.
5. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
6. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
7. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

PART B: BASIC ELECTRONICS ENGINEERING

UNIT-I: Semiconductor Devices

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction – Course Outcomes	1	03-02-2026		TLM1	
2.	Evolution of electronics, Vacuum tubes to nano electronics	1	04-02-2026		TLM1	
3.	Characteristics of PN Junction Diode	1	06-02-2026		TLM1	
4.	Zener Effect — Zener Diode and its Characteristics	1	07-02-2026		TLM1	
5.	Bipolar Junction Transistor	1	10-02-2026		TLM1	
6.	CB Configurations and Characteristics	1	11-02-2026		TLM1	
7.	CE Configurations and Characteristics.	1	13-02-2026		TLM1	
8.	CC Configurations and Characteristics and Elementary Treatment of Small Signal CE Amplifier.	1	14-02-2026		TLM2	
No. of classes required to complete UNIT-I: 08				**No. of classes taken:**		

UNIT-II: Basic Electronic Circuits and Instrumentation

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
9.	**Rectifiers and power supplies**: Block diagram description of a DC power supply	1	17-02-2026		TLM1	
10.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	18-02-2026		TLM1	
11.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	20-02-2026		TLM1	
12.	Working of simple Zener voltage regulator.	1	21-02-2026		TLM1	
13.	Working of simple Zener voltage regulator.	1	24-02-2026		TLM2	
14.	**Amplifiers**: Block diagram of Public Address system	1	25-02-2026		TLM1	
15.	Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency	1	27-02-2026		TLM2	

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	response.					
16.	**Electronic Instrumentation:** Block diagram of an electronic instrumentation system.	1	28-02-2026		TLM2	
17.	Electronic Instrumentation: Block diagram of an electronic instrumentation system.	1	03-03-2026		TLM2	
No. of classes required to complete UNIT-II: 09				**No. of classes taken:**		

UNIT-III: Digital Electronics

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Overview of Number Systems	1	06-03-2026		TLM1	
19.	Logic gates including Universal Gates, BCD codes	1	07-03-2026		TLM2	
20.	Excess-3 code, Gray code	1	10-03-2026		TLM1	
21.	Hamming code	1	11-03-2026		TLM2	
22.	Boolean Algebra, Basic Theorems and properties of Boolean Algebra	1	13-03-2026		TLM1	
23.	Truth Tables and Functionality of Logic Gates	1	14-03-2026		TLM1	
24.	Simple combinational circuits	1	17-03-2026		TLM1	
25.	Half and Full Adders	1	18-03-2026		TLM2	
26.	Introduction to sequential circuits and Flip flops	1	20-03-2026		TLM1	
27.	Registers and counters	1	21-03-2026		TLM2	
No. of classes required to complete UNIT-III: 10				**No. of classes taken:**		

I Mid Examinations: 23-03-2026 to 28-03-2026

PART A: BASIC ELECTRICAL ENGINEERING

UNIT-I: DC & AC Circuits

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
28.	Introduction to Course and Course Outcomes	1	31-03-2026		TLM1	
29.	**DC Circuits:** Electrical circuit elements (R, L and C)	1	01-04-2026		TLM1	
30.	Ohm's Law and its limitations	1	03-04-2026		TLM1	
31.	KCL & KVL	1	04-04-2026		TLM2	
32.	Series, Parallel, series-parallel circuits	1	07-04-2026		TLM1	
33.	Superposition theorem	1	08-04-2026		TLM1	
34.	**AC Circuits:** A.C. Fundamentals:	1	10-04-2026		TLM1	
35.	Equation of AC Voltage and current, waveform	1	11-04-2026		TLM1	
36.	Time period, frequency, amplitude, phase, phase difference, average value, RMS value	1	15-04-2026		TLM1	
37.	Form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits	1	17-04-2026		TLM1	
38.	Concept of Impedance, Active power, reactive power and apparent power, power factor	1	18-04-2026		TLM2	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Machines and Measuring Instruments

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	**Machines:** Construction, principle and operation of DC Motor	1	21-04-2026		TLM1	
40.	Construction, principle and operation of DC Generator	1	22-04-2026		TLM2	
41.	Construction, principle and operation of Single-Phase Transformer	1	24-04-2026		TLM2	
42.	Construction, principle and operation of Three Phase Induction Motor	1	25-04-2026		TLM2	
43.	Construction, principle and operation of Alternator	1	28-04-2026		TLM1	
44.	Applications of electrical machines	1	29-04-2026		TLM1	
45.	**Measuring Instruments:** Construction and working principle of Permanent Magnet Moving Coil (PMMC)	1	01-05-2026		TLM2	
46.	Moving Iron (MI) Instruments, Wheatstone Bridge	1	02-05-2026		TLM2	
47.	Wheatstone Bridge	1	05-05-2026		TLM1	
No. of classes required to complete UNIT-II: 09				**No. of classes taken:**		

UNIT-III: Energy Resources, Electricity Bill & Safety Measures

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
48.	**Energy Resources**: Conventional and non-conventional energy resources	1	06-05-2026		TLM1	
49.	Layout and operation of various Power Generation systems: Hydel power generation	1	08-05-2026		TLM1	
50.	Layout and operation of nuclear power generation	1	09-05-2026		TLM1	
51.	Layout and operation of Solar power generation	1	12-05-2026		TLM1	
52.	Layout and operation of Wind power generation.	1	13-05-2026		TLM1	
53.	**Electricity bill:** Power rating of household appliances including air conditioners PCs, Laptops, Printers, etc.	1	15-05-2026		TLM1	
54.	Definition of "unit" used for consumption of electrical energy,	1	16-05-2026		TLM1	
55.	Two-part electricity tariff	1	02-06-2026		TLM1	
56.	Calculation of electricity bill for domestic consumers	1	03-06-2026		TLM1	
57.	**Equipment Safety Measures:** Working principle of Fuse and Miniature Circuit Breaker (MCB), merits and demerits.	1	05-06-2026		TLM1	
58.	**Equipment Safety Measures:** Working principle of Fuse and Miniature Circuit Breaker (MCB), merits and demerits.	1	06-06-2026		TLM1	
59.	**Personal Safety Measures**:	1	09-06-2026		TLM2	

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	Electric Shock, Earthing and its types, Safety Precautions to avoid shock.					
60.	**Personal Safety Measures**: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	1	10-06-2026		TLM2	
61.	Introduction to Oscillators Content Beyond Syllabus	1	12-06-2026		TLM2	
62.	Revision of I, II and III Units	1	13-06-2026		TLM6	
No. of classes required to complete UNIT-III: 15				**No. of classes taken:**		

II Mid Examinations: 15-06-2026 to 20-06-2026

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 & 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):	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	02-02-2026	21-03-2026	7W
I Mid Examinations	23-03-2026	28-03-2026	1W
II Phase of Instructions	30-03-2026	16-05-2026	7W
Summer Vacation	18-05-2026	30-05-2026	2W
II Phase of Instructions	01-06-2026	13-06-2026	2W
II Mid Examinations	15-06-2026	20-06-2026	1W
Preparation and Practical's	22-06-2026	27-06-2026	1W
Semester End Examinations	29-06-2026	11-07-2026	2W

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 a	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO b	Design and analyze electrical machines, modern drive and lighting systems
PSO c	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO d	Design controllers for electrical and electronic systems to improve their performance.

Date: 02-02-2026

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Dr. B. Rambabu	Dr. A.V.G.A. Marthanda	Dr. G. Nageswara Rao	Dr. G. Srinivasulu

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING(AI & ML)

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. V. SIVANAGARAJU
Course Name & Code : DATA STRUCTURES & 23CS02
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/CSE(AI & ML)/II /A **A.Y.:** 2025-26

PREREQUISITE: Programming for Problem Solving Using C-20CS01

COURSE EDUCATIONAL OBJECTIVES(CEO):

The objective of the course is to make students familiar with writing algorithms to implement different data structures like stacks, queues, trees and graphs, and various sorting techniques.

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

CO1	Understand the role of linear and nonlinear data structures in organizing and accessing data **(Understand-L2)**
CO2	Implement abstract data type (ADT) and data structures for given application. **(Apply-L3)**
CO3	Design algorithms based on techniques like linked list, stack, queue, trees etc. **(Apply-L3)**
CO4	Apply the appropriate linear and nonlinear data structure techniques for solving a problem. **(Apply-L3)**
CO5	Design hash-based solutions for specific problems. **(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	2											2		
CO2	3	2	2	1									2		
CO3	3	2	2	1									2		
CO4	3	2	2	1									2		
CO5	3	2	2	1									2		
1 - Low			**2 –**Medium							**3 -** High					

TEXTBOOKS:

T1 Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.

T2 Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan AndersonFreed, Silicon Press, 2008

REFERENCE BOOKS:

R1 Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders

R2 C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft

R3 Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum

R4 Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein

R5 Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Linear Data 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
1.	Introduction and Discussion of CO's	1	02-02-2026		TLM1	
2.	Definition and Importance of Linear Data Structures	1	03-02-2026		TLM1	
3.	Abstract Data Types and Implementation	1	05-02-2026		TLM1	
4.	Overview of time and space complexity	1	06-02-2026		TLM1	
5.	Analysis of Liner Data structures	2	09-02-2026 10-02-2026		TLM1	
6.	Revise Arrays	1	12-02-2026		TLM1	
7.	Searching Techniques: Linear Search	1	13-02-2026		TLM1	
8.	Binary Search & Analysis	2	16-02-2026 17-02-2026		TLM1	
9.	Bubble Sort & Analysis	1	19-02-2026		TLM1	
10.	Insertion Sort & Analysis	2	20-02-2026 23-02-2026		TLM1	
11.	Selection Sort & Analysis	2	24-02-2026 26-02-2026		TLM1	
No. of classes required to complete UNIT-I: 15				**No. of classes taken:**		

UNIT-II: Linked Lists

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.	List Implementation using Arrays and Array Disadvantages	1	27-02-2026		TLM1	
13.	Linked List Representation	1	02-03-2026		TLM1	
14.	Sing Linked List : Operations	3	05-03-2026 06-03-2026 09-03-2026		TLM1	
15.	Double Linked List : Operations	2	10-03-2026 12-03-2026		TLM1	
16.	Circular Single Linked List	1	13-03-2026		TLM1	
17.	Circular Double Linked List	2	16-03-2026 17-03-2026		TLM1	
18.	Comparing Arrays and Linked List	1	20-03-2026		TLM1	
19.	Applications of Linked Lists: Polynomial Representation	1	30-03-2026		TLM1	
20.	Polynomial Addition	1	31-03-2026		TLM1	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: Stacks:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Introduction to Stacks : Properties	1	02-04-2026		TLM1	

22.	Operations of Stacks	1	06-04-2026		TLM1	
23.	Implementation of stacks using arrays	1	07-04-2026		TLM1	
24.	Stacks using Linked List	1	09-04-2026		TLM1	
25.	Expressions: Expression evaluation	2	10-04-2026 13-04-2026		TLM1	
26.	Infix to Postfix Conversion	2	16-04-2026 17-04-2026		TLM1	
27.	Checking Balanced Parenthesis	2	20-04-2026 21-04-2026		TLM1	
28.	Reversing a List	1	23-04-2026		TLM1	
29.	Backtracking	1	24-04-2026		TLM1	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: Queues

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30.	Introduction to queues: properties and operations,	1	27-04-2026		TLM1	
31.	Implementing queues using arrays	1	28-04-2026		TLM1	
32.	Implementing queues using Linked List	1	30-04-2026		TLM1	
33.	Applications of Queue : Scheduling	1	01-05-2026		TLM1	
34.	Breadth First Search	1	04-05-2026		TLM1	
35.	Circular Queue	2	05-05-2026 07-05-2026		TLM1	
36.	Double ended queue	2	08-05-2026 11-05-2026		TLM1	
37.	Applications of Deque	1	12-05-2026		TLM1	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: TREES & HASHING TECHNQIUES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
38.	Introduction to Trees	1	14-05-2026		TLM1	
39.	Representation of Trees	1	15-05-2026		TLM1	
40.	Tree Traversals	1	01-06-2026		TLM1	
41.	Binary Search Trees-Operations	2	02-06-2026 03-06-2026		TLM1	
42.	Hashing Introduction	1	04-06-2026		TLM1	
43.	Hash Functions	1	05-06-2026		TLM1	
44.	Collison Resolution Techniques: Separate Chaining	1	08-06-2026		TLM1	
45.	Open Addressing: Linear Probing	1	09-06-2026		TLM1	
46.	Quadratic Probing, Double Hashing	1	10-06-2026		TLM1	
47.	Rehashing	1	11-06-2026		TLM1	
48.	Applications of Hashing	1	12-06-2026		TLM1	
No. of classes required to complete UNIT-V: 12				**No. of classes taken:**		

Content Beyond 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
1.	Evaluation of Prefix Expression	1	18-04-2026					
2.	Towers of Hanoi	1	25-04-2026					
3.	Extendable Hashing	1	31-05-2026					
No. of classes		3			No. of classes taken:			
II MID EXAMINATIONS (03-06-2024 TO 08-06-2024)								

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 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	**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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Dr. V.Sivanagaraju**	**Dr. Y.V.B Reddy**	**Dr. Y.V.B Reddy**	**Dr. S.Jayaprada**
Signature				

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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. J. Venkateswara Rao, Professor,
Mr. J. Rangaiah, Associate Professor,
Mr. P.M.G. Raju, Assistant Professor

Course Name & Code : Engineering Graphics–23ME01
L-T-P Structure : **3-0-4** **Credits:** 3
Program/Sem/Sec : B.Tech, II SEM, CE **A.Y.:**2025-26

PREREQUISITE: Engineering Physics, Mathematics

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections

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

CO1	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections. (**Understand**)
CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views. (**Apply**)
CO3	Understand and draw projection of solids in various positions in first quadrant. (**Apply**)
CO4	Able to draw the development of surfaces of simple objects (**Apply**)
CO5	Prepare isometric and orthographic sections of simple solids. (**Apply**)

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	3	2	3	-	-	-	-	-	-	3	-	1	3
CO2	3	3	1	2	1	-	-	-	-	-	-	3	-	1	3
CO3	3	3	3	2	1	-	-	-	-	-	-	3	-	1	3
CO4	3	2	3	2	3	-	-	-	-	-	-	3	-	1	3
CO5	2	3	3	2	1	-	-	-	-	-	-	3	-	1	3
1 - Low **2 –**Medium **3 -** High															

TEXTBOOKS:

T1 N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

REFERENCE BOOKS:

R1 Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.

R2 Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009.

R3 Engineering Drawing with an Introduction to AutoCAD, DhananjayJolhe, Tata McGraw Hill, 2017

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: INTRODUCTION TO ENGINEERING GRAPHICS, LETTERING, SCALES, CURVES, ORTHOGRAPHIC PROJECTIONS

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 & Fundamentals and Role Engineering Graphics	03	03.02.2026		TLM 1,2	
2.	Instruments needed and their use-Conventions in Drawing, – BIS Conventions, Lines, Lettering, and Dimensioning Practice	03	06.02.2026		TLM 1, 2, 3	
3.	Geometrical Constructions and Constructing regular polygons by general methods, Practice. Scales: Plain scales, diagonal scales, and vernier scales	03	10.02.2026		TLM 1,2	
4.	Construction of Ellipse, Parabola and Hyperbola by general method -Practice	03	13.02.2026		TLM 1, 2, 3	
5.	Construction of Cycloids, Involutes, Normal and tangent to Curves, Practice	03	17.02.2026		TLM 1, 2, 3	
6.	Orthographic Projections: Reference plane, importance of reference lines or Plane, Practice	03	20.02.2026		TLM 1, 2, 3	
7.	Projections of a points situated in any one of the four quadrants, Practice	03	24.02.2026		TLM 1, 2, 3	
No. of classes required to complete UNIT-I: 21				**No. of classes taken:**		

UNIT-II: PROJECTIONS OF STRAIGHT LINES & PROJECTIONS OF PLANES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	Projections of straight lines parallel to both reference planes, perpendicular to one reference plane, and parallel to other reference planes, Practice.	03	27.02.2026		TLM 1, 2, 3	
9.	Projections of lines inclined to one reference plane and parallel to the other reference plane, Practice	03	06.03.2026		TLM 1, 2, 3	
10	Projections of Straight Line Inclined to both the reference planes, Practice	03	10.03.2026		TLM 1, 2, 3	
11	Projections of Regular planes Perpendicular to both reference planes, parallel to one reference plane, and inclined to the other reference plane, Practice	03	13.03.2026		TLM 1, 2, 3	
12	Projections of planes inclined to both the reference planes, Practice	03	17.03.2026		TLM 1, 2, 3	
No. of classes required to complete UNIT-II: 15				**No. of classes taken:**		

MID-1 Examination	**23.03.2026-28.03.2026**

UNIT-III: PROJECTIONS OF SOLIDS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Polyhedra and Solids of revolution. Projections of solids in simple positions: Axis perpendicular to HP, Practice	03	31.03.2026		TLM 1, 2, 3	
14.	Projections of solids in simple positions: Axis perpendicular to VP and Axis parallel to both the reference planes	03	07.04.2026		TLM 1, 2, 3	
15.	Practice	03	10.04.2026		TLM 3	
16.	Projection of Solids with axis inclined to one reference plane and parallel to another plane, Practice	03	17.04.2026		TLM 1, 2, 3	
17.	Practice	03	21.04.2026		TLM 3	
18.	Practice on miscellaneous problems	03	24.04.2026		TLM 1, 2, 3	
No. of classes required to complete UNIT-III:18				**No. of classes taken:**		

UNIT-IV: SECTIONS OF SOLIDS & DEVELOPMENT OF SURFACES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Introduction to Sections of Solids and Development of Surfaces: Perpendicular and inclined section planes	03	28.04.2026		TLM 1, 2, 3	
20.	Sectional views and True shape of section, Practice	03	01.05.2026		TLM 1, 2, 3	
21.	Sections of solids in simple position only, Practice	03	05.05.2026		TLM 1, 2, 3	
22.	Introduction to Methods of Development of Surfaces, Parallel Line Development (Plane Surfaces), Practice	03	08.05.2026		TLM 1, 2, 3	
23.	Radial Line Development, practice	03	12.05.2026		TLM 1, 2, 3	
24.	Practice	03	15.05.2026		TLM3	
No. of classes required to complete UNIT-IV: 18				**No. of classes taken:**		

UNIT-V: CONVERSION OF VIEWS & COMPUTER GRAPHICS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	Introduction to Isometric Views, Conversion of Views: Conversion of isometric views to orthographic views;	03	02.06.2026		TLM 1, 2, 3	
26.	Practice	03	05.06.2026		TLM 1, 2, 3	
27.	Conversion of orthographic views to isometric views-Practice	03	09.06.2026		TLM 1, 2, 3	
28.	**Computer Graphics**: Creating 2D & 3D drawings of objects, including PCB and Transformations using Auto CAD	03	12.06.2026		TLM1,2	
No. of classes required to complete UNIT-V: 12				**No. of classes taken:**		
MID – II Examination				**15.06.2026 – 20.06.2026**		
Preparation & Practicals				**22.06.2026 – 27.06.2026**		
Semester End Examinations				**29.06.2026 – 11.07.2026**		

TEACHING -LEARNING METHODS:

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

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
I-Descriptive Examination (Units-I,II)	M1=15
II-Descriptive Examination (UNIT-III,IV&V)	M2=15
Day to Day Evaluation (UNITs - I, II, III, IV & V)	15
Mid Marks(M) =80% of Max(M1,M2)+20%of Min(M1,M2)	M=30
Cumulative Internal Examination(CIE):M+DDE	30
Semester End Examination(SEE)	70
Total Marks=CIE+SEE	100

PART-D

PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

PEO1	To possess knowledge in both fundamental and application aspects of mathematical, scientific, engineering principles to analyze complex engineering problems for meeting the national and international requirements and demonstrating the need for sustainable development
PEO2	To adapt to the modern engineering tools for planning, analysis, design, implementation of analytical data and assess their relevant significance in societal and legal issues necessary in their professional career
PEO3	To exhibit professionalism, ethical attitude, communication, managerial skills, team work and social responsibility in their profession and adapt to current trends by engaging in continuous 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.
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 public health and safety, and the cultural, societal, and environmental considerations.

Signature			
Name of the Faculty	**Dr. J. Venkateswara Rao**	**Mr. J. Subba Reddy**	**Dr.K.V.Ramana**
Designation/Title	Prof./Course Instructor	Assoc. Prof./Course	Assoc. Prof. / HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with "A" Grade & NBA (Under Tier - I)

An ISO 21001:2018, 14001:2015, 50001:2018 Certified Institution

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

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

Phone: 08659-222933, **Fax**: 08659-222931

DEPARTMENT OF ECE

LAB HANDOUT

PART-A

Date: 02-02-2026

Name of Course Instructor : Dr. B Rambabu, Dr P Venkata Rao, Mr.Ch Mallikarjuna Rao, Mr. N. Dharmacahri

Course Name & Code : Electrical & Electronics Engineering Workshop (23EE51)

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

Program/Sem : B.Tech., CSE(AI&ML), II Sem **A.Y.** : 2025-26

PREREQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

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 & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	2						2	3	2		1				
CO2	2	2		2				2	2	2						
CO3	2	2	2	2				2	2	2				2		
CO4	2	2		3				2	3	2		1	2			
CO5	3	2			2			2	2	2	1	1	2	2	3	2
CO6	3	3		2	2			2	3	3		1			3	
1 - Low **2 –**Medium **3 -** High																

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

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
	Introduction to BEEE Lab (Function Generators, CRO, RPS, Breadboard etc), Course Objectives and Outcomes.	3	05-02-2026		TLM4	
	Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.	3	12-02-2026		TLM4	
	Plot V – I characteristics of Zener Diode and its application as voltage Regulator.	3	19-02-2026		TLM4	
	Implementation of half wave and full wave rectifiers	3	26-02-2026		TLM4	
	Plot Input & Output characteristics of BJT in CB configuration-04	3	05-03-2026		TLM4	
	Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs	3	12-03-2026		TLM4	
	Verification of truth Tables of SR and JK Flip flop	3	19-03-2026		TLM4	
	Internal Lab Examination (**Electronics**)	3	26-03-2026		TLM4	
	Verification of KCL and KVL	3	02-04-2026		TLM4	
	Verification of Superposition Theorem	3	09-04-2026		TLM4	
	Measurement of Resistance using Wheat stone bridge	3	16-04-2026		TLM4	
	Magnetization Characteristics of DC Shunt Generator	3	23-04-2026		TLM4	
	Measurement of Power and Power factor using Single-phase wattmeter	3	30-04-2026		TLM4	
	Calculation of Electrical Energy for Domestic Premises	3	07-05-2026		TLM4	
	Internal Lab Examination (**Electricals**)	3	14-05-2026		TLM4	
No. of classes required: 45				**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.
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 a	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO b	Design and analyze electrical machines, modern drive and lighting systems
PSO c	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO d	Design controllers for electrical and electronic systems to improve their performance.

Date: 02-02-2026

Course Instructors	Course Coordinator	Module Coordinator	Head of the Department
Dr. B Rambabu, Dr P Venkata Rao, Mr.Ch Mallikarjuna Rao, Mr. N. Dharmacahri.	Dr. AVGA Marthanda	Dr. G.Nageswara Rao	Dr. G.Srinivasulu

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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:**	B. Tech., II-Sem., CSM-A
ACADEMIC YEAR	**:**	2025-2026
COURSE NAME & CODE	**:**	ENGINEERING PHYSICS LAB & 23FE53
L-T-P STRUCTURE	**:**	0-0-2
COURSE CREDITS	**:**	1
COURSE INSTRUCTOR	**:**	**Dr. S. YUSUB /** Dr. P. SOBHANACHALAM
COURSE COORDINATOR	**:**	**Dr. S. YUSUB**

Course Objectives:
To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes:
CO1: Analyze the wave properties of light using optical instruments (Apply-L3).
CO2: Estimate the elastic modulii of various materials and acceleration due to gravity (Apply-L3).
CO3: Demonstrate the vibrations in stretched strings (Understand-L2).
CO4: Evaluate dielectric constant and magnetic field of circular coil carrying current (Apply-L3).
CO5: Examine the characteristics of semiconductor devices (Apply-L3).

Course articulation matrix (Correlation between CO's and PO's):

Engineering Physics Lab												
COURSE DESIGNED BY	**FRESHMAN ENGINEERING DEPARTMENT**											
Course Outcomes	**Programme Outcomes**											
PO's →	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1.	**3**	**3**	**2**	**1**				**1**	1			**1**
CO2.	**3**	**3**	**2**	**1**				**1**	1			**1**
CO3.	**3**	**3**	**2**	**1**				**1**	1			**1**

CO4.	**3**	**3**	**2**	**1**				**1**	1			**1**
CO5.	**3**	**3**	**2**	**1**				**1**	**1**			**1**
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 TEXT BOOKS:

1. Lab Manual Prepared by the LBRCE.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section- CSM-A

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	3	04-02-2026		**TLM4**	1,2,3,4	T4	
2.	Demonstration	3	11-02-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
3.	Experiment 1	3	18-02-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
4.	Experiment 2	3	25-02-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
5.	Experiment 3	3	04-03-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
6.	Experiment 4	3	11-03-2026		**TLM4**	CO1, CO2, CO3, CO4	T4	
7.	Experiment 5	3	18-03-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
8.	Demonstration	3	01-04-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
9.	Experiment 6	3	08-04-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
10.	Experiment 7	3	15-04-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
11.	Experiment 8	3	22-04-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
12.	Experiment 9	3	29-04-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	

13.	Experiment 10	3	06-05-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
14.	Revision	3	13-05-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
15.	**Internal Exam**	3	03-06-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
16.	**Internal Exam**	3	10-06-2026		**TLM4**	CO1, CO2, CO3, CO4, CO5	T4	
No. of classes required to complete LAB		48			No. of classes taken:			

EVALUATION PROCESS:

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 EDUCATIONAL OBJECTIVES (PEOs)

Graduates of ECE program will be:

PEO 1. To Attain a solid foundation in Electronics & Communication Engineering fundamentals with an attitude to pursue continuing education.

PEO 2. To Function professionally in the rapidly changing world with advances in technology.

PEO 3. To Contribute to the needs of the society in solving technical problems using Electronics & Communication Engineering principles, tools and practices.

PEO 4. To Exercise leadership qualities, at levels appropriate to their experience, which addresses issues in a responsive, ethical, and innovative manner

PROGRAM OUTCOMES:

Engineering Graduates will be able to:

(1). **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

(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.

(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.

(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.
(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.
(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.
(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.
(8). **Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
(9). **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
(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.
(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.
(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.

PROGRAM SPECIFIC OUTCOMES (PSOs):

Graduate of the ECE will have the ability to
(1) Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
(2) Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools
(3) Apply the Signal processing techniques to synthesize and realize the issues related to real time applications.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr. S. YUSUB / Dr. P. SOBHANACHALAM	Dr. S. YUSUB	Dr. S. YUSUB	Dr. T. SATYANARAYANA

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L.B. Reddy Nagar, Mylavaram, NTR District, Andhra Pradesh - 521230

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech. II-Sem, AIML-A SECTION

ACADEMIC YEAR : 2024-25

COURSE NAME & CODE : Engineering Workshop, 20ME51

L-T-P STRUCTURE : 0-0-3

COURSE CREDITS : 1.5

COURSE INSTRUCTOR : Mr. Mallikarjuna Rao Dandu, Sr. Assistant Professor,
Mr. S. Srinivasa Reddy, Sr. Assistant Professor

COURSE COORDINATOR : Seelam Srinivasa Reddy, Assoc. Professor

PRE-REQUISITE: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

COURSE OBJECTIVE:

The objective of this course is to get familiarized with various trades used in Engineering Workshop and learn the safety pre-cautions to be followed in the workshops, while working with the different tools.

COURSE OUTCOMES (CO)

CO1	Design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.
CO2	Fabricate and model various basic prototypes in the trade of fitting such as Straight fit, V-fit.
CO3	Produce various basic prototypes in the trade of Tin smithy such as Rectangular tray, and open Cylinder.
CO4	Perform various basic House Wiring techniques.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3		2	3	3	3			3			2		3	2
CO2	3		2	3	3	3			3			2		3	2
CO3	3		2	3	3	3			3			2		3	2
CO4	3		2	3	3	3			3			2		3	2

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

REFERENCE:

R1	Lab Manual

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S. No.	Experiment to be conducted	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Reference	HOD Sign Weekly
1.	Induction	3	14-02-2026		TLM8	-	
2.	Experiment-1	3	21-02-2026		TLM8	R1	
3.	Experiment-2	3	28-02-2026		TLM8	R1	
4.	Experiment-3	3	07-03-2026		TLM8	R1	
5.	Experiment-4	3	14-03-2026		TLM8	R1	
I-Mid Examinations (23-03-2026 to 28-03-2026)							
6.	Experiment-5	3	04-04-2026		TLM8	R1	
7.	Experiment-6	3	11-04-2026		TLM8	R1	
8.	Experiment-7	3	18-04-2026		TLM8	R1	
9.	Experiment-8	3	25-04-2026		TLM8	R1	
10.	Experiment-9	3	02-05-2026		TLM8	R1	
11.	Experiment-10	3	09-05-2026		TLM8	R1	
12.	Repetition lab	3	16-05-2026		TLM8	--	
13.	Repetition lab	3	06-06-2026		TLM8	--	
14.	Lab Internal	3	13-06-2026		TLM6	--	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	02-02-2026	21-03-2026	7W
I Mid Examinations	23-03-2026	28-03-2026	1W
II Phase of Instructions	30-03-2026	16-05-2026	7W
Summer Vacation	18-05-2026	30-06-2026	2W
II Phase of Instructions	01-06-2026	13-06-2026	2W
II Mid Examinations	15-06-2026	20-06-2026	1W
Preparation and Practical's	22-06-2026	27-06-2026	1W
Semester End Examinations	29-06-2026	11-07-2026	2W

Part-C

EVALUATION PROCESS:

Parameter	Marks
Day–to–Day Work	A1=10 Marks
Record And Observation	B1= 05 Marks
Internal Test	C1 = 15 Marks
Cumulative Internal Examination (CIE = A1 + B1 + C1)	A1+B1+C1=30Marks
Semester End Examinations (SEE)	D1 = 70 Marks
Total Marks : A1+B1+C1+D1	100 Marks

Details of Batches: A-SEC

Batch No.	Reg. No. of Students	Number of Students	Batch No.	Reg. No. of Students	Number of Students
B11	24761A4212, 4232, 25761A4201 TO 25761A4206	8	B21	25761A4231 TO 25761A4238	8
B12	25761A4207 TO 25761A4214	8	B22	25761A4239 TO 25761A4246	8
B13	25761A4215 TO 25761A4222	8	B23	25761A4247 TO 25761A4254	8
B14	25761A4223 TO 25761A4230	8	B24	25761A4255 TO 25761A4262	8

Batch No:	Exp. 01	Exp. 02	Exp. 03	Exp. 04	Exp. 05	Exp. 06	Exp. 07	Exp. 08	Exp. 09
B11	F1	F2	P1	P2	C1	C2	E1	E2	T1
B12	F2	F1	P2	P1	C2	C1	E2	E1	T1
B13	P1	P2	C1	C2	E1	E2	F1	F2	T1
B14	P2	P1	C2	C1	E2	E1	F2	F1	T1
B21	C1	C2	E1	E2	F1	F2	P1	P2	T1
B22	C2	C1	E2	E1	F2	F1	P2	P1	T1
B23	E1	E2	F1	F2	P1	P2	C1	C2	T1
B24	E2	E1	F2	F1	P2	P1	C2	C1	T1

LIST OF EXPERIMENTS:

Exp. No.	Name of the Experiment	Related CO
1.	Carpentry-1(C1)-Corner Bridle Joint	CO1
2.	Carpentry-2(C2)-Dove Tail Joint	CO1
3.	Fitting-1(F1)-L-**J**oint	CO2
4.	Fitting-2(F2)-V-**J**oint	CO2
5.	Plumbing-1(P1)-Pipe Threading practice	CO3
6.	Plumbing-2(P2)-Pipe Layout	CO3
7.	House Wiring-1(E1)–Series and Parallel connection	CO4
8.	HouseWiring-2(E2)–Fluorescent Lamp and Calling Bell Circuit	CO4
9.	Tinsmity-1(T1)- Rectangular Tray	CO2
10.	Demonstration- Welding and Foundry	CO2

NOTIFICATION OF CYCLE:

cycle	Exp. No.	Name of the Experiment	Related CO
Cycle 1	1.	Carpentry-1(C1)-Corner Bridle Joint	CO1
	2.	Carpentry-2(C2)-Dove tail Joint	CO1
	3.	Fitting-1(F1)-T-**J**oint	CO2
	4.	Fitting-2(F2)-V-**J**oint	CO2
	5.	Plumbing-1(P1)-Pipe Threading practice	CO3
Cycle 2	6.	Plumbing-2(P2)-Pipe Layout	CO3
	7.	House Wiring-1(E1)–Series and Parallel Connection	CO4
	8.	House Wiring-2(E2)–Fluorescent Lamp and Calling bell Circuit	CO4
	9.	Tinsmity-1(T1)- Rectangular Tray	CO2
	10.	Demonstration- Welding and Foundry	CO2

PROGRAMME EDUCATIONAL OBJECTIVES:

PEO1: To build a professional career and pursue higher studies with sound knowledge in Mathematics, Science and Mechanical Engineering.

PEO2: To inculcate strong ethical values and leadership qualities for graduates to become successful in multi-disciplinary activities.

PEO3: To develop inquisitiveness towards good communication and lifelong learning.

PROGRAM OUT COMES (POs)

Engineering Graduates will be able to :

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyses complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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.
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.
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.
6. **The engineer and society**: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
9. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.
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 instruction

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 multi disciplinary environments.

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):

1. To apply the principles of thermal sciences to design and develop various thermal systems.
2. To apply the principles of manufacturing technology, scientific management towards Improvement of quality and optimization of engineering systems in the design, analysis and manufacture ability of products.
3. To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Course Instructors	**Course Coordinator**	**Module Coordinator**	**HOD**
Mr. Mallikarjuna Rao Dandu **Mr. S. Srinivasa Reddy(Jr)**	**Mr. S. Srinivasa Reddy**	**Mr. J. Subba Reddy**	**Dr. M. B. S Sreekara Reddy**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
Accredited by NAAC with "A" Grade &NBA for ME, ASE, CE, CSE, ECE, EEE & IT (Under Tier - I)
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L.B. Reddy Nagar, Mylavaram, NTR Dist., Andhra Pradesh-521 230.
Phone: 08659-222933, **Fax**: 08659-222931
FRESHMAN ENGINEERING DEPARTMENT

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:** B. Tech., II-Sem., **CSM-A**
ACADEMIC YEAR	**:** 2025-2026
COURSE NAME & CODE	**:** Engineering Physics-23FE04
L-T-P STRUCTURE	**:** 3-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**: Dr. S. YUSUB**
COURSE COORDINATOR	**: Dr. S. YUSUB**

To bridge the gap between the physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

Course Outcomes:

CO1: Analyze the intensity variation of light due to interference, diffraction and Polarization (Apply-L3).
CO2: Understand the basics of crystals and their structures (Understand-L2).
CO3: Summarize various types of polarization of dielectrics and classify the magnetic materials (Understand-L2)
CO4: Explain fundamentals of quantum mechanics and free electron theory of metals (Understand-L2).
CO5: Identify the type of semiconductor using Hall Effect (Apply-L3).

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

ENGINEERING PHYSICS												
COURSE DESIGNED BY	**FRESHMAN ENGINEERING DEPARTMENT**											
Course Outcomes	**Programme Outcomes**											
PO's →	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1.	**3**	**3**	**2**	**1**	**1**	**1**	**1**					**1**
CO2.	**3**	**3**	**2**	**1**	**1**	**1**	**1**					**1**
CO3.	**3**	**3**	**2**	**1**	**1**	**1**						**1**
CO4.	**3**	**3**	**2**	**1**	**1**	**1**	**1**					**1**

CO5.	**3**	**3**	**2**	**1**	**1**	**1**	**1**					**1**
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 TEXT BOOKS:

TEXT BOOKS

1. A Text book of "Engineering Physics" M.N. Avadhanulu, P.G. Kshirsagar, TVS Arun Murthy, S. Chand & Co., 11th Edition, 2019.
2. Engineering Physics – *D.K. Bhattacharya & Poonam Tandon, Oxford press (2015)*

REFERENCES

1. Engineering Physics - B.K.Pandey & S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
3. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press 2010.
4. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web Resource: //www.loc.gov/rr/scitech/selected-internet/physics.html

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): CSM-A

UNIT-I : Interference and diffraction

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.	Course Outcomes INTERFERENCE: Introduction	1	02-02-2026		TLM1	CO1	T1	
2.	Principle of superposition	1	03-02-2026		TLM1	CO1	T1	
3.	Interference of light, Interference in thin films by reflection reflection & applications	1	05-02-2026		TLM2	CO1	T1	
4.	colors in thin films	1	07-02-2026		TLM1	CO1	T1	
5.	Newton's rings	1	09-02-2026		TLM1	CO1	T1	
6.	ination of wavelength active index.	1	10-02-2026		TLM1	CO1	T1	
7.	DIFFRACTION: Introduction,	1	12-02-2026		TLM1	CO1	T1	
8.	Fresnel and Fraunhoffer diffractions	1	14-02-2026		TLM2	CO1	T1	

No. of classes required to complete UNIT-I	8	No. of classes taken:

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
9.	Fraunhoffer diffraction due to single slit,	1	16-02-2026		TLM1	CO1	T1	
10.	double slit & N slits (Qualitative)	1	17-02-2026		TLM1	CO1	T1	
11.	Diffraction Grating, Dispersive power	1	19-02-2026		TLM2	CO1	T1	
12.	Resolving power of Grating(Qualitative)	1	21-02-2026		TLM1	CO1	T1	
13.	Polarization : Introduction	1	23-02-2026		TLM1	CO1	T1	
14.	Types of polarization	1	24-02-2026		TLM1	CO1	T1	
15.	Polarization by reflection	1	26-02-2026		TLM1	CO1	T1	
16.	refraction & double refraction	1	28-02-2026		TLM2	CO1	T1	
17.	Nicol's prism	1	02-03-2026		TLM1	CO1	T1	
18.	half wave and quarter wave plates	1	03-03-2026		TLM1	CO1	T1	
No. of classes required to complete UNIT-II		10			No. of classes taken:			

UNIT – II: Crystallography & X– ray Diffraction

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
19	Crystallography, Space lattice; Basis, Unit cell	1	05-03-2026		TLM1	CO2	T1	
20	Lattice parameters, Bravais Lattices	1	07-03-2026		TLM2	CO2	T1	
21	Crystal Systems (3D)- Coordination number, Packing fraction of -SC	1	09-03-2026		TLM1	CO2	T1	
22	BCC, FCC	1	10-03-2026		TLM1	CO2	T1	
23	ndices, separation between ve (hkl) planes.	1	12-03-2026		TLM2	CO2	T1	
24	X–ray diffraction: Bragg's law; X–ray	1	14-03-2026		TLM1	CO2	T1	

	Diffractometer,							
25	Structure determination by Powder methods.	1	16-03-2026		TLM1	CO2	T1	
26	Revision	1	17-03-2026		TLM2	CO1, CO2		
27	I MID	1.5	23-03-2026			CO1, CO2,		
28	I MID	1.5	24-03-2026			CO1, CO2,		
29	I MID	1.5	25-03-2026			CO1, CO2,		
30	I MID	1.5	26-03-2026			CO1, CO2,		
31	I MID	1.5	28-03-2026			CO1, CO2,		
No. of classes required to complete UNIT-II		16		No. of classes taken:				

UNIT – III : DIELECTRIC & MAGNETIC MATERIALS

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
32.	DIELECTRIC MATERIALS: Introduction	1	30-03-2026		TLM1	CO3	T1	
33.	Dielectric polarization- Dielectric polarizability, Susceptibility, Dielectric constant & Displacement Vector	1	31-03-2026		TLM2	CO3	T1	
34.	Relation between the electric vectors	1	02-04-2026		TLM1	CO3	T1	
35.	Types of polarizations- Electronic (Quantitative), ionic (Quantitative) & orientation polarizations (Qualitative)	1	04-04-2026		TLM2	CO3	T1	

36.	Lorentz internal field	1	06-04-2026		TLM1	CO3	T1	
37.	Claussius-Mosotti equation	1	07-04-2026		TLM2	CO3	T1	
38.	ex dielectric constant – cy dependence of polariz tric loss.	1	09-04-2026		TLM1	CO3	T1	
39.	MAGNETIC MATERIALS : Introduction:	1	11-04-2026		TLM2	CO3	T1	
40.	Magnetic dipole moment – Magnetization- Magnetic susceptibility & permeability	1	13-04-2026		TLM2	CO3	T1	
41.	Atomic origin of magnetism	1	16-04-2026		TLM2	CO3	T1	
42.	Classification of magnetic materials- Dia, para, Ferro, anti-ferro & Ferri magnetic materials	1	18-04-2026		TLM1	CO3	T1	
43.	Domain concept for Ferromagnetism & Domain walls	1	20-04-2026		TLM2	CO3	T1	
44.	Hysteresis – soft and hard magnetic materials	1	21-04-2026		TLM2	CO3	T1	
No. of classes required to complete UNIT-IV		14			No. of classes taken:			

UNIT – IV: QUANTUM MECHANICS & FREE ELECTRON THEORY

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
45.	QUANTUM MECHANICS: Dual nature of matter- Heisenberg's Uncertainty Principle	1	23-04-2026		TLM1	CO4	T1	
46.	significance & properties of wave function	1	25-04-2026		TLM2	CO4	T1	
47.	Schrodinger's time independent and dependent wave equations	1	27-04-2026		TLM2	CO4	T1	
48.	in a one –dimensional i	1	28-04-2026		TLM1	CO4	T1	

	l well.							
49.	FREE ELECTRON THEORY: Classical free electron theory (Qualitative with discussion of merits and demerits)	1	30-04-2026		TLM2	CO4	T1	
50.	Quantum free electron theory	1	02-05-2026		TLM1	CO4	T1	
51.	electrical conductivity based on quantum free electron theory	1	04-05-2026		TLM2	CO4	T1	
52.	Fermi -Dirac distribution	1	05-05-2026		TLM2	CO4	T1	
53.	Density of states – Fermi energy	1	07-05-2026		TLM1	CO4	T1	
	V: SEMI CONDUCTORS							
54.	SEMI CONDUCTORS: Formation of energy bands	1	09-05-2026		TLM2	CO5	T1	
55.	classification of crystalline solids- Intrinsic semiconductors	1	11-05-2026		TLM1	CO5	T1	
56.	Density of charge carriers- Electrical conductivity- Fermi level -Extrinsic semiconductors	1	12-05-2026		TLM1	CO5	T1	
57.	Density of charge carriers	1	14-05-2026		TLM1	CO5	T1	
58.	dependence of Fermi energy on carrier concentration and temperature	1	16-05-2026		TLM1	CO5	T1	
59.	**Summer Vacation 18-05-2026 to 30-05-2026**							
60.	Drift and Diffusion Currents	1	01-06-2026		TLM1	CO5	T1	

61.	Einstein's equation	1	02-06-2026		TLM2	CO5	T1	
62.	fect & its applications.	1	04-06-2026		TLM1	CO5	T1	
63.	Revision	1	06-06-2026		TLM1		T1	
64.	Revision	1	08-06-2026		TLM1		T1	
65.	Revision	1	09-06-2026		TLM1		T1	
66.	Revision	1	11-06-2026		TLM1		T1	
67.	Revision	1	13-06-2026		TLM1		T1	
No. of classes required to complete UNIT-V		12			No. of classes taken:			

Contents 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
68.	SEM	1	11-06-2026		TLM1		R1	
69.	Conventional energy sources	1	13-06-2026		TLM1		R1	
75	Mid II	1	15-06-2026			CO3, CO4, CO5		
76	Mid II	1	16-06-2026			CO3, CO4, CO5		
77	Mid II	1	17-06-2026			CO3, CO4, CO5		
78	Mid II	1	18-06-2026			CO3, CO4, CO5		
79	Mid II	1	19-06-2026			CO3, CO4, CO5		
80	Mid II	1	20-06-2026			CO3, CO4, CO5		
81	Preparation and Practicals	**22-06-2026 to 27-06-2026**						
82	Semester end examinations	**29-06-2026 to 11-07-2026**						

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:

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Graduates of Artificial Intelligence and Machine Learning program will be:

PEO1: Possess a solid foundation of the fundamentals of engineering, mathematics, and statistics underpinning AI & ML.

PEO2: Innovate and adapt AI & ML techniques and other allied fields to address emerging challenges in technology, science, and society.

PEO3: Ability to work collaboratively in multidisciplinary teams to develop AI and ML solutions for projects.

PEO4: Facilitate the dynamic demands of society through a practical perspective.

PROGRAM OUTCOMES:

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
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.
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.
7. Environment and sustainability: Understand the impact of the professional engineering solution sin societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

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.
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.
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.

PROGRAM SPECIFIC OUTCOMES (PSOs):

Graduates of Artificial Intelligence and Machine Learning will have the ability to

PSO1: Advanced Software System Development

Graduates will be able to design and develop sophisticated software systems by applying strong knowledge of data structures, algorithm analysis, web technologies, and machine learning techniques.

PSO2: Data Analysis and Insight Generation

Graduates will possess strong data analysis and interpretation skills, enabling them to extract meaningful insights and patterns from large datasets using AI and ML methodologies.

PSO3: AI & ML Solutions for Real-World Problems

Graduates will be able to develop innovative AI and machine learning solutions that strategically leverage data-driven approaches and technical expertise to solve complex, real-world problems.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr. S. YUSUB	Dr. S. YUSUB	Dr. S. YUSUB	Dr. T. SATYANARAYANA

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING(AI & ML)

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.V. SIVANAGARAJU
Course Name & Code **:** DATA STRUCTURES LAB & 23CS52
L-T-P Structure **: 0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/CSE(AI &ML)/II/A **A.Y.:** 2025-26

PREREQUISITE: PPSC

COURSE EDUCATIONAL OBJECTIVE:
The objective of this course is to make students familiar with writing algorithms to implement different data structures like stacks, queues, trees and graphs, and various sorting techniques.

COURSE OUTCOMES (CO):
CO1: Apply Linear Data Structures for organizing the data efficiently **(Apply-L3)**
CO2: Apply Non- Linear Data Structures for organizing the data efficiently **(Apply-L3)**
CO3: Develop and implement hashing techniques for solving problems (**Apply - L3**)
CO4: Improve individual / teamwork skills, communication & report writing skills with ethical values.

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	2	2	1	3								3		
CO2	3	2	2	1	3								3		
CO3	3	2	2	1	3								3		
CO4								2	2	2	2	2			

Note: 1- Slight (Low), **2 -** Moderate (Medium), **3 -** Substantial (High)

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	HOD Sign
1.	Array Manipulations	3	09-02-2026		
2.	Searching and Sorting Techniques	3	16-02-2026		
3.	Single Linked List	3	23-02-2026		
4.	Double Linked List	3	02-03-2026		
5.	Circular Linked List	3	09-03-2026		
6.	Polynomial Representation & Polynomial Addition	3	16-03-2026		
7.	Linked List Applications	3	30-03-2026		
8.	Stack Implementation	3	06-04-2026		
9.	Stack Applications	3	13-04-2026		
10.	Queue Implementation & Circular Queue	3	20-04-2026		
11.	Double Ended Queue	3	27-04-2026		
12.	Trees	3	04-05-2026		
13.	Hashing	3	11-05-2026		
14.	Internal Exam	3	01-06-2026		

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):

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	**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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Dr. V.Sivanagaraju	Dr. Y.V.B Reddy	Dr. Y.V.B Reddy	Dr. S. Jayaprada
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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L.B. Reddy Nagar, Mylavaram, NTR Dist., Andhra Pradesh-521 230.

Phone: 08659-222933, **Fax**: 08659-222931

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT
PART-A

Course Instructor	**:** P. Vijaya Sirisha	
Course Name & Code	**:** Engineering Physics & 23FE04	**Credits:** 3
L-T-P Structure	**: 3-1-0**	**A.Y.:** 2025-26
Program/Sem./Branch	: B.Tech/I/CSM B	**Regulations**: R23

Pre-requisite **:** Basic Knowledge of Physics

Course Objectives:

To bridge the gap between the physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

Course Outcomes (COs): At the end of this course, the student will be able to

CO1	Analyze the intensity variation of light due to interference, diffraction and Polarization **(Apply)**
CO2	Understand the basics of crystals and their structures **(Understand)**
CO3	Summarize various types of polarization of dielectrics and classify the magnetic materials **(Understand)**
CO4	Explain fundamentals of quantum mechanics and free electron theory of metal **(Understand)**
CO5	Identify the type of semiconductor using Hall Effect **(Apply)**

Course Articulation Matrix (Correlation between COs, Pos & PSOs):

Course Designed by				Division of Physics, Freshman Engineering Department								
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	2	1	1	1	1	-	-	-	-	1
CO2	3	3	2	1	1	1	1	-	-	-	-	1
CO3	3	3	2	1	1	1		-	-	-	-	1
CO4	3	3	2	1	1	1	1	-	-	-	-	1
CO5	3	3	2	1	1	1	1	-	-	-	-	1
1 = Slight (Low)				**2** = Moderate (Medium)				**3** = Substantial (High)				

Textbooks

1. Engineering Physics, M.N.Avadhanulu, P.G.Kshirsagar, T.V.S. Arun Murthy, *S.Chand &Co.*, *11th Ed.*, 2019.
2. Engineering Physics, D.K. Bhattacharya & Poonam Tandon, *Oxford Press*, 2015.

References

1. Engineering Physics, B.K. Pandey & S. Chaturvedi, *Cengage Learning*, 2021.
2. Engineering Physics, Shatendra Sharma, Jyotsna Sharma, *Pearson Education*, 2018.
3. Engineering Physics, Sanjay D. Jain, D. Sahasrabudhe and Girish, *University Press*, 2010.
4. Engineering Physics, M.R. Srinivasan, *New Age International Publishers*, 2009.

Web Resources

1. http://www.loc.gov/rr/scitech/selected-internet/physics.html
2. http://www.freebookcentre.net/Physics/Solid-State-Physics-Books.html
3. http://physicsdatabase.com/free-physics-books/
4. http://www.e-booksdirectory.com

5. http://www.thphys.physics.ox.ac.uk

PART-B

Course Delivery Plan (Lesson Plan): ASE

Unit-I: Interference, Diffraction & Polarization **Course Outcome:** CO1; **Textbook:** T1, R2

SI.	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 Course & its Outcomes	1	03-02-2026		TLM-2	
2.	**Interference**: Introduction, Principle of Superposition, Interference of light	1	05-02-2026		TLM-1	
3.	Interference in thin films by Reflection & Applications	1	06-02-2026		TLM-1	
4.	Colors in thin films, Newton's rings	1	07-02-2026		TLM-1	
5.	Determination of wavelength and refractive index	1	10-02-2026		TLM-1	
6.	**Diffraction**: Introduction, Fresnel and Fraunhoffer diffractions	1	12-02-2026		TLM-1	
7.	Problems & Assignment/Tutorial	1	13-02-2026		TLM-3	
8.	Fraunhoffer diffraction due to single slit	1	14-02-2026		TLM-2	
9.	Double slit & N slits (Qualitative)	1	17-02-2026		TLM-2	
10.	Diffraction Grating, Dispersive power & Resolving power of Grating-Qualitative	1	19-02-2026		TLM-1	
11.	Tutorial	1	20-02-2026		TLM-3	
12.	**Polarization**: Introduction – Types of polarization	1	21-02-2026		TLM-2	
13.	Polarization by reflection, refraction & double refraction	1	19-02-2026		TLM-2	
14.	Nicol's Prism	1	24-02-2026		TLM-1	
15.	Tutorial	1	26-02-2026		TLM-3	
16.	Half wave and Quarter wave plates	1	27-02-2026		TLM-2	
No. of classes required to complete UNIT-I: 16				**No. of classes taken:**		

Unit-II: Crystallography & X– Ray Diffraction **Course Outcome**: CO2; **Textbook**: T1, R2

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
17.	**Crystallography:** Space lattice; Basis, Unit cell & Lattice parameters	1	28-02-2026		TLM-2	
18.	Crystal Systems (3D)	1	03-03-2026		TLM-2	
19.	Bravais Lattices	1	05-03-2026		TLM-2	
20.	Coordination number and Packing fraction of SC, BCC	1	06-03-2026		TLM-1	
21.	Coordination number and Packing fraction of FCC	1	07-03-2026		TLM-1	
22.	Miller indices-Properties	1	10-03-2026		TLM-1	
23.	Tutorial	1	12-03-2026		TLM-3	
24.	Miller indices-Sketching planes	1	13-03-2026			
25.	Separation between successive (hkl) planes	1	17-03-2026		TLM-2	
26.	**X-ray diffraction:** Bragg's law	1	19-03-2026		TLM-2	
27.	X–ray Diffractometer	1	20-03-2026		TLM-2	
28.	Crystal Structure determination by Laue's method& Powder method	1	21-03-2026		TLM 2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

Unit-III: Dielectric & Magnetic Materials **Course Outcome:** CO3; **Textbook:** T1, R

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	**Dielectric Materials:** Introduction, Dielectric polarization, Dielectric polarizability, Susceptibility	1	31-03-2026		TLM-2	
30.	Dielectric constant and displacement vector	1	02-04-2026		TLM-2	
31.	Relation between the electric vectors	1	04-04-2026		TLM-1	
32.	Types of polarizations- Electronic polarization (Quantitative)	1	07-04-2026		TLM-1	
33.	Tutorial	1	09-04-2026		TLM-3	
34.	Ionic Polarization (Quantitative) & Orientation polarization (Qualitative)	1	10-04-2026		TLM-2	
35.	Lorentz internal field	1	11-04-2026		TLM-2	
36.	Claussius-Mossotti equation, complex dielectric constant	1	16-04-2026		TLM-1	
37.	Frequency dependence of polarization	1	17-04-2026		TLM-1	
38.	Dielectric loss	1	18-04-2026		TLM-1	
39.	**Magnetic Materials:** Introduction Magnetic dipole moment, Magnetization, Magnetic susceptibility and permeability	1	21-04-2026		TLM-2	
40.	Tutorial	1	23-04-2026		TLM-3	
41.	Atomic origin of magnetism	1	24-04-2026		TLM-1	
42.	Classification of magnetic materials- Dia, Para, Ferro, Anti-Ferro & Ferri magnetic materials	1	25-04-2026		TLM-1	
43.	Domain concept for Ferromagnetism & Domain walls	1	28-04-2026		TLM-1	
44.	Hysteresis, Soft and hard magnetic materials	1	30-04-2026		TLM-1	
No. of classes required to complete UNIT-III: 16				**No. of classes taken:**		

Unit-IV: Quantum Mechanics & Free Electron Theory **Course Outcome:** CO4; **Textbook:** T1, R2

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	**Quantum Mechanics:** Dual nature of matter, De-Broglie's Hypothesis	1	01-05-2026		TLM-2	
46.	Heisenberg's Uncertainty Principle		02-05-2026		TLM-1	
47.	Significance & properties of wave function	1	05-05-2026		TLM-2	
48.	Schrodinger's time independent and dependent wave equations	1	07-05-2026		TLM-1	
49.	Tutorial	1	08-05-2026		TLM-3	
50.	Particle in a one –dimensional infinite potential well	1	09-05-2026		TLM-1	
51.	**Free Electron Theory:** Classical free electron theory (Qualitative with discussion of merits and demerits)	1	12-05-2026		TLM-1	
52.	Quantum free electron theory, Electrical conductivity based on quantum free electron theory	1	14-05-2026		TLM-2	
53.	Tutorial	1	15-05-2026		TLM-3	
54.	Fermi -Dirac distribution and temperature dependence		16-05-2026		TLM-1	

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
55.	Density of states, Fermi energy	1	02-06-2026		TLM-1	
No. of classes required to complete UNIT-III: 10				**No. of classes taken:**		

Unit-V: Semiconductor Physics **Course Outcome:** CO5; **Textbook:** T2, R1

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
56.	**Semiconductors**: Formation of energy bands, Classification of crystalline solids	1	04-06-2026		TLM-1	
57.	Intrinsic semiconductors, Density of charge carriers	1	05-06-2026		TLM-1	
58.	Electrical conductivity, Fermi level	1	06-06-2026		TLM-2	
59.	Extrinsic semiconductors p-type & N Type density of charge carriers	1	09-06-2026		TLM-2	
60.	Dependence of Fermi energy on carrier concentration &temperature	1	11-06-2026		TLM-1	
61.	Drift and Diffusion Currents, Einstein's equation	1	12-06-2026		TLM-1	
62.	Hall Effect & its applications	1	13-06-2026		TLM-1	
No. of classes required to complete UNIT-III: 10				**No. of classes taken:**		

Teaching-Learning Methods			
TLM-1	Chalk and talk	**TLM-4**	Demonstration (Lab/Field Visit)
TLM-2	PPT/A illustrations	**TLM-5**	ICT (NPTEL/Swayam Prabha /MOOCS)
TLM-3	Tutorial/Quiz/Assignment	**TLM-6**	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):

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.

Date: 11-08-2025

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
P. Vijaya Sirisha	Dr. S. Yusuf	Dr. S. Yusuf	Dr. T. Satyanarayana

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING(AUTONOMOUS)
Accredited by NAAC with "A" Grade &NBAfor ASE, CE, CSE, ECE, EEE, ME& IT (Under Tier - I)
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L.B. Reddy Nagar, Mylavaram, NTR Dist., Andhra Pradesh-521 230.
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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:** I B. Tech., II-Sem., AI&ML
ACADEMIC YEAR	**:** 2025-26
COURSE NAME & CODE	**:** Differential Equations & Vector Calculus
L-T-P STRUCTURE	**:** 3-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**: Dr.A.Rami Reddy**
COURSE COORDINATOR	**:** Dr. K.Bhanu lakshmi
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	03/02/2026		TLM2			
2.	Course Outcomes, Program Outcomes	1	03/02/2026		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	04/02/2026		TLM1	CO1	T1, T2	
4.	Linear Differential equation	1	0502/2026		TLM1	CO1	T1, T2	
5.	Bernoulli's DE	1	06/02/2026		TLM1	CO1	T1, T2	
6.	Exact DE	1	07/02/2026		TLM1	CO1	T1, T2	
7.	Non-exact DE Type I	1	10/02/2026		TLM1	CO1	T1, T2	
8.	Non-exact DE Type I1	1	11/02/2026		TLM1	CO1	T1, T2	
9.	Non- Type III exact DE	1	12/02/2026		TLM3	CO1	T1, T2	
10.	TUTORIAL - 1	1	13/02/2026		TLM1	CO1	T1, T2	
11.	Non-exact DE Type IV	1	17/02/2026		TLM1	CO1	T1, T2	
12.	Non-exact DE Type IV	1	18/02/2026		TLM1	CO1	T1, T2	
13.	Newton's Law of cooling	1	19/02/2026		TLM1	CO1	T1, T2	
14.	TUTORIAL-2	1	20/02/2026		TLM1	CO1	T1, T2	
15.	Law of natural growth and decay	1	21/02/2026		TLM1	CO1	T1, T2	
16.	Electrical circuits	1	24/02/2026		TLM3	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	25/02/2026		TLM1	CO1	T1, T2	
18.	Solving a homogeneous DE	1	26/02/2026		TLM1	CO1	T1, T2	
19.	TUTORIAL-3	1	27/02/2026		TLM1	CO1	T1, T2	
20.	Finding Particular Integral, P.I for e^{ax+b}	1	28/02/2026		TLM1	CO1	T1, T2	
21.	P.I for Cosbx, or sinbx	1	04/03/2026		TLM1	CO1	T1, T2	
22.	P.I for polynomial function	1	05/03/2026		TLM1	CO1	T1, T2	
23.	TUTORIAL	1	06/03/2026		TLM1	CO1	T1, T2	
24.	P.I for $e^{ax+b}v(x)$	1	07/03/2026		TLM3	CO1	T1, T2	
25.	P.I for $x^k v(x)$	1	10/03/2026		TLM1	CO1	T1, T2	
26.	Method of Variation of parameters	1	11/03/2026		TLM1	CO1	T1, T2	

27.	Method of Variation of parameters	1	12/03/2026		TLM1	CO1	T1, T2	
28.	TUTORIAL-4	1	13/03/2026		TLM1	CO1	T1, T2	
29.	Simultaneous linear equations	1	14/03/2026		TLM1	CO1	T1, T2	
30.	L-C-R circuits	1	17/03/2026		TLM3	CO1	T1, T2	
31.	Simple Harmonic motion	1	18/03/2026					
No. of classes required to complete UNIT-II		16			No. of classes taken:			

I MID EXAMINATIONS (23-03-2026 TO 28-03-2026)

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
32.	Introduction to Unit III	1	20/03/2026		TLM1	CO2	T1, T2	
33.	Formation of PDE by elimination of arbitrary constants	1	31/03/2026		TLM1	CO2	T1, T2	
34.	Formation of PDE by elimination of arbitrary functions	1	01/03/2026		TLM1	CO2	T1, T2	
35.	Formation of PDE by elimination of arbitrary functions	1	02/04/2026		TLM1	CO2	T1, T2	
36.	Solving of PDE	1	04/04/2026		TLM1	CO2	T1, T2	
37.	Lagrange's Method	1	07/04/2026		TLM1	CO2	T1, T2	
38.	Homogeneous Linear PDE with constant coefficients	1	08/04/2026		TLM1	CO2	T1, T2	
39.	Homogeneous Linear PDE with constant coefficients	1	09/04/2026		TLM3	CO2	T1, T2	
40.	TUTORIAL - 5	1	10/04/2026		TLM1	CO2	T1, T2	
41.	Homogeneous Linear PDE with constant coefficients	1	15/04/2026		TLM1	CO2	T1, T2	
42.	Homogeneous Linear PDE with constant coefficients	1	16/04/2026		TLM3	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
43.	Introduction to UNIT IV	1	17/04/2026		TLM1	CO3	T1, T2	
44.	Vector Differentiation	1	18/04/2026		TLM1	CO3	T1, T2	
45.	Gradient	1	21/04/2026		TLM1	CO3	T1, T2	
46.	Directional Derivative	1	22/04/2026		TLM1	CO3	T1, T2	
47.	Curl	1	23/04/2026		TLM1	CO3	T1, T2	
48.	TUTORIAL-6	1	24/04/2026		TLM3	CO3	T1, T2	

49.	TUTORIAL	1	25/04/2026		TLM1	CO3	T1, T2	
50.	Solenoidal fields, Irrotational fields, potential surfaces	1	28/04/2026		TLM1	CO3	T1, T2	
51.	Solenoidal fields, Irrotational fields, potential surfaces	1	29/04/2026		TLM1	CO3	T1, T2	
52.	Vector Identities	1	30/04/2026		TLM1	CO3	T1, T2	
53.	Vector Identities	1	28/04/2026		TLM3	CO3	T1, T2	
54.	Laplacian, second order operators	1	29/04/2026		TLM1	CO3	T1, T2	
55.	Vector Identities	1	30/05/2026		TLM1	CO3	T1, T2	
56.	TUTORIAL-7	1	01/05/2026		TLM3	CO3	T1, T2	
No. of classes required to complete UNIT-IV		14			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
58.	Introduction to Unit-V	1	02/05/2026		TLM1	CO4	T1, T2	
59.	Line Integral	1	05/05/2026		TLM1	CO4	T1, T2	
60.	Circulation	1	06/05/2026		TLM1	CO4	T1, T2	
61.	Work done	1	07/05/2026		TLM1	CO4	T1, T2	
62.	TUTORIAL - 8	1	08/05/2026		TLM1	CO4	T1, T2	
63.	Volume Integral	1	09/05/2026		TLM3	CO4	T1, T2	
64.	9Surface Integral, Flux	1	12/05/2026		TLM1	CO4	T1, T2	
65.	Green's Theorem	1	13/05/2026		TLM1	CO4	T1, T2	
66.	TUTORIAL -9	1	15/05/2026		TLM1	CO4	T1, T2	
67.	Stoke's Thoerem	1	16/05/2026		TLM1	CO4	T1, T2	
68.	Stoke's Thoerem	1	02/06/2026		TLM3	CO4	T1, T2	
69.	TUTORIAL - 10	1	0306/2026		TLM1	CO4	T1, T2	
70.	Divergence Theorem	1	04/06/2026		TLM1	CO4	T1, T2	
71.	TUTORIAL -11	1	05/06/2026					
72	Divergence Theorem	1	06/06/2026					
73	Revision	1	09/06/2026					
74	TUTORIAL -12	1	10/06/2026					
75	Revision	1	11/06/2026					
76	TUTORIAL -13	1	12/06/2026					
No. of classes required to complete UNIT-V		14			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
72.	Non-homogeneous Linear PDE with constant coefficients	1	12/06/2026		TLM2	CO2	T1,T2	

No. of classes	1	No. of classes taken:
II MID EXAMINATIONS (15-06-2026 TO 20-06-2026)		

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-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 thecontextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to 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 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.A.Rami Reddy	**Dr. K.Jhansi Rani**	**Dr. A. Rami Reddy**	**Dr.T.Satyanarayana**
Course Instructor	Course Coordinator	Module Coordinator	HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. B. Rambabu **Date**: 02-02-2026
Course Name & Code **:** Basic Electrical & Electronics Engineering – 23EE01
L-T-P Structure **: 3-0-0** **Credits:** 3
Program/Sem./Sec. : B.Tech/I/CSE(AI&ML)-B Sec **A.Y.:** 2023-24
Regulations: R23

PREREQUISITE: Physics

Course Objectives (COs)

Basic Electrical Engineering:

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.

Basic Electronics Engineering

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: BASIC ELECTRICAL ENGINEERING	
CO1	Extract electrical variables of AC & DC circuits using 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 systems. **(Understand)**
PART-B: BASIC ELECTRONICS ENGINEERING	
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)**

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3									1	3	2		2
CO2	2	2												2		3
CO3	2	2				3					2	2	2			
CO4	3	2										1	2		3	2
CO5	3	2										1	2		3	2
CO6	2	2	2										2		2	1
1 - Low **2 –**Medium **3 -** 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
4. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
5. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata Mc Graw Hill, 2009

REFERENCE BOOKS:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition
2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020

3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017
4. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications,2018, II Edition.
5. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
6. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
7. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

PART B: BASIC ELECTRONICS ENGINEERING

UNIT-I: Semiconductor Devices

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction – Course Outcomes	1	04-02-2026		TLM1	
2.	Evolution of electronics, Vacuum tubes to nano electronics	1	04-02-2026		TLM1	
3.	Characteristics of PN Junction Diode	1	05-02-2026		TLM1	
4.	Zener Effect — Zener Diode and its Characteristics	1	07-02-2026		TLM1	
5.	Bipolar Junction Transistor	1	11-02-2026		TLM1	
6.	CB Configurations and Characteristics	1	11-02-2026		TLM1	
7.	CE Configurations and Characteristics.	1	12-02-2026		TLM1	
8.	CC Configurations and Characteristics and Elementary Treatment of Small Signal CE Amplifier.	1	14-02-2026		TLM2	
No. of classes required to complete UNIT-I: 08				**No. of classes taken:**		

UNIT-II: Basic Electronic Circuits and Instrumentation

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
9.	**Rectifiers and power supplies**: Block diagram description of a DC power supply	1	18-02-2026		TLM1	
10.	Working of full wave bridge rectifier (no analysis)	1	18-02-2026		TLM1	
11.	Working of full wave bridge rectifier with capacitor filter (no analysis)	1	19-02-2026		TLM1	
12.	Working of simple Zener voltage regulator.	1	21-02-2026		TLM1	
13.	Working of simple Zener voltage regulator.	1	25-02-2026		TLM2	
14.	**Amplifiers**: Block diagram of Public Address system	1	25-02-2026		TLM1	
15.	Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response.	1	26-02-2026		TLM2	
16.	**Electronic Instrumentation:** Block diagram of an electronic instrumentation system.	1	28-02-2026		TLM2	
No. of classes required to complete UNIT-II: 08				**No. of classes taken:**		

UNIT-III: Digital Electronics

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
17.	Overview of Number Systems	1	04-03-2026		TLM1	
18.	Logic gates including Universal	1	04-03-2026		TLM2	

	Gates, BCD Codes					
19.	Excess-3 code, gray code	1	05-03-2026		TLM2	
20.	Hamming code	1	07-03-2026		TLM1	
21.	Boolean Algebra	1	11-03-2026		TLM1	
22.	Basic Theorems and properties of Boolean Algebra	1	11-03-2026		TLM1	
23.	Truth Tables and Functionality of Logic Gates	1	12-03-2026		TLM1	
24.	Simple combinational circuits	1	14-03-2026		TLM2	
25.	Half and Full Adders	1	18-03-2026		TLM1	
26.	Introduction to sequential circuits	1	18-03-2026		TLM2	
27.	Flip flops	1	19-03-2026			
28.	Registers and counters	1	21-03-2026		TLM2	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

I Mid Examinations: 23-03-2026 to 28-03-2026

PART A: BASIC ELECTRICAL ENGINEERING

UNIT-I: DC & AC Circuits

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Introduction to Course and Course Outcomes	1	01-04-2026		TLM1	
30.	**DC Circuits:** Electrical circuit elements (R, L and C)	1	01-04-2026		TLM1	
31.	Ohm's Law and its limitations	1	02-04-2026		TLM1	
32.	KCL & KVL	1	04-04-2026		TLM2	
33.	Series, Parallel, series-parallel circuits	1	08-04-2026		TLM1	
34.	Superposition theorem	1	08-04-2026		TLM1	
35.	**AC Circuits:** A.C. Fundamentals:	1	09-04-2026		TLM1	
36.	Equation of AC Voltage and current, waveform	1	11-04-2026		TLM1	
37.	Time period, frequency, amplitude, phase, phase difference, average value, RMS value	1	15-04-2026		TLM1	
38.	Form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits	1	15-04-2026		TLM1	
39.	Concept of Impedance, Active power, reactive power and apparent power	1	16-04-2026		TLM2	
40.	Concept of power factor (Simple Numerical problems).	1	18-04-2026		TLM1	
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: Machines and Measuring Instruments

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	**Machines:** Construction, principle and operation of DC Motor	1	22-04-2026		TLM1	
42.	Construction, principle and operation of DC Generator	1	22-04-2026		TLM2	
43.	Construction, principle and operation of Single-Phase Transformer	1	23-04-2026		TLM2	
44.	Construction, principle and operation of Three Phase	1	25-04-2026		TLM2	

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	Induction Motor					
45.	Construction, principle and operation of Alternator	1	29-04-2026		TLM1	
46.	Applications of electrical machines	1	29-04-2026		TLM1	
47.	**Measuring Instruments:** Construction and working principle of Permanent Magnet Moving Coil (PMMC)	1	30-04-2026		TLM2	
48.	Moving Iron (MI) Instruments, Wheatstone Bridge	1	02-05-2026		TLM2	
No. of classes required to complete UNIT-II: 08				**No. of classes taken:**		

UNIT-III: Energy Resources, Electricity Bill & Safety Measures

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
49.	**Energy Resources**: Conventional and non-conventional energy resources	1	06-05-2026		TLM1	
50.	Layout and operation of various Power Generation systems: Hydel power generation	1	06-05-2026		TLM1	
51.	Layout and operation of nuclear power generation	1	07-05-2026		TLM1	
52.	Layout and operation of Solar power generation	1	09-05-2026		TLM1	
53.	Layout and operation of Wind power generation.	1	13-05-2026		TLM1	
54.	**Electricity bill:** Power rating of household appliances including air conditioners PCs, Laptops, Printers, etc.	1	13-05-2026		TLM1	
55.	Definition of "unit" used for consumption of electrical energy,	1	14-05-2026		TLM1	
56.	Two-part electricity tariff	1	16-05-2026		TLM1	
57.	Calculation of electricity bill for domestic consumers	1	03-06-2026		TLM1	
58.	**Equipment Safety Measures:** Working principle of Fuse and Miniature Circuit Breaker (MCB), merits and demerits.	1	03-06-2026		TLM1	
59.	**Equipment Safety Measures:** Working principle of Fuse and Miniature Circuit Breaker (MCB), merits and demerits.	1	04-06-2026		TLM1	
60.	**Personal Safety Measures**: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	1	06-06-2026		TLM2	
61.	**Personal Safety Measures**: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.	1	10-06-2026		TLM2	
62.	Introduction to Oscillators Content Beyond Syllabus	1	10-06-2026		TLM2	
63.	Revision of UNIT I, II, III	1	11-06-2026		TLM2	
No. of classes required to complete UNIT-III: 15				**No. of classes taken:**		

II Mid Examinations: 15-06-2026 to 20-06-2026

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 & 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):	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	02-02-2026	21-03-2026	7W
I Mid Examinations	23-03-2026	28-03-2026	1W
II Phase of Instructions	30-03-2026	16-05-2026	7W
Summer Vacation	18-05-2026	30-05-2026	2W
II Phase of Instructions	01-06-2026	13-06-2026	2W
II Mid Examinations	15-06-2026	20-06-2026	1W
Preparation and Practical's	22-06-2026	27-06-2026	1W
Semester End Examinations	29-06-2026	11-07-2026	2W

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 a	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO b	Design and analyze electrical machines, modern drive and lighting systems
PSO c	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO d	Design controllers for electrical and electronic systems to improve their performance.

Date: 02-02-2026

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Dr. B. Rambabu	Dr. A.V.G.A. Marthanda	Dr. G. Nageswara Rao	Dr. G. Srinivasulu

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

COURSE HANDOUT
PART-A

Name of Course Instructor(s): **Seelam Sreenivasa Reddy (T808), Dr.B.Sudheer Kumar (T542), Mr. K.Venkateswara Reddy (T821)**

Course Name & Code	: EngineeringGraphics–23ME01	**Regulations**	: R23
L-T-P Structure	: 2– 0-4	**Credits**	:03
Program/Sem/Sec	: B.Tech/II SEM CSE(AI&ML)-B Section	**A.Y.**	: 2025-26
PREREQUISITE	: EngineeringPhysics,Engineering Mathematics		

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solids and Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometric and Perspective projections.

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

CO1	Understand the principles of engineering drawing, including engineering curves, scales, Orthographic and isometric projections. (**Understanding Level –L2**)
CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views. (**Applying Level –L3**)
CO3	Understand and draw projection of solids in various positions in first quadrant. (**Apply –L3**)
CO4	Able to draw the development of surfaces of simple objects. (**Applying Level –L3**)
CO5	Prepare isometric and orthographic sections of simple solids. (**Applying Level –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	2	2	-	-	-	-	-	-	-	-	3	2	1	2
CO2	3	2	1	-	-	-	-	-	-	-	-	3	1	1	2
CO3	3	2	2	-	-	-	-	-	-	-	-	3	-	1	2
CO4	3	2	2	-	-	-	-	-	-	-	-	3	2	1	2
CO5	2	2	2	-	-	-	-	-	-	-	-	3	-	-	-

1 - Low **2 –**Medium **3 -** High

TEXTBOOKS:

T1 N.D.Bhatt,EngineeringDrawing,51th Revised and EnlargedEdition,Charotarpublishers,2012

REFERENCEBOOKS:

R1 NarayanaKL,KannaiahP,TextbookonEngineeringDrawing,2ndEdition, SciTechpublishers.
R2 R.K.Dhawan,EngineeringDrawing,S.ChandCompanyLTD.
R3 Venugopal,EngineeringDrawingandGraphics,NewAgepublishers
R4 DhananjayA.Jolhe, EngineeringDrawing, TataMcGrawHillPublishers
R5 N.S.Parthasarathy,VelaMurali,EngineeringDrawing,OxfordHigherEducation

COURSEDELIVERYPLAN(LESSONPLAN) **PART-B**

UNIT-I:INTRODUCTION,GEOMETRICAL CONSTRUCTIONS, SCALES, CONICS,CYCLOIDS,INVOLUTES, ORTHOGRAPHICPROJECTIONSOFPOINTS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
01	Introduction to Engineering Graphics: COs,CEOs,POsandPEOs **UNITI:INTRODUCTION:** Introduction to EngineeringDrawing, Principles of Engineering Graphics,and their Significance	2	02-02-2026		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
02	DrawingInstrumentsand theiruse-ConventionsinDrawing, Lines, Lettering,andDimensioning–BIS Conventions, Practice	3	03-02-2026		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
03	**Geometrical Constructions** and Constructing regular polygons by general methods, **Scales**: Plain scales, diagonal scales, and vernier scales	2	09-02-2026		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
04	Engineering**Curves**:ConicSections, Construction of Ellipse, Parabola, and Hyperbola by general method only	3	10-02-2026		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
05	Construction of Cycloids, Involutes, Normal and Tangent to Curves, Practice	2	16-02-2026		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
06	**Orthographic Projections**: Reference plane, importance of reference lines or Plane, Practice	3	17-02-2026		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
07	Projections of a point situated in any one of the four quadrants, Practice	2	23-02-2026		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
08	Projections of a point situated in any one of the four quadrants, Practice	3	24-02-2026		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
No.ofclassesrequiredtocompleteUNIT-I:20(Lecture: 08,Practice: 12)			**No. of classes taken (includingPractice):**					

UNIT-II:PROJECTIONSOFSTRAIGHT LINES AND PLANES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
09	**Projectionsofstraightlines:**Projections of straight lines parallel to both reference planes, perpendicular to one reference plane, and parallel to other reference planes, Practice	2	02-03-2026		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
10	Projectionsoflinesinclined to one reference plane and parallel to the other reference plane, Practice	3	03-03-2026		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
11	Projections of Straight Line Inclined to both the reference planes, Practice	2	09-03-2026		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
12	**Projections of Planes:** Projections of Regular planes Perpendicular to both reference planes, parallel to one reference plane, and inclined to the other reference plane, Practice	3	10-03-2026		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
13	Projections of planes inclined to both the reference planes, Practice	2	16-03-2026		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
14	Practice	3	17-03-2026		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
-	**I Mid Examinations: From 23-03-2026 to 28-03-2026 (Covered CO 1 & CO 2)**							
No.ofclassesrequiredtocompleteUNIT-II:20(Lectures: 06, Practice: 09)			**No. of classes taken (includingPractice):**					

UNIT-III: PROJECTIONS OF SOLIDS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
15	Types of solids: Polyhedra and Solids of revolution. Projections of solids in simplepositions: Axis perpendicular to HP, Practice	2	30-03-2026		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
16	Projections of solids in simplepositions: Axis perpendicular to vertical plane and Axis parallel to both the reference planes	3	31-03-2026		TLM 1, 2	**CO 3**	**T1, R1 to R5**	
17	Projection of Solids with axis inclined to one reference plane and parallel to another plane, Practice	2	06-04-2026		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
18	Numericals	3	07-04-2026		TLM 1, 2	**CO 3**	**T1, R1 to R5**	
19	Practice	2	13-04-2026		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
20	Practice	3	14-04-2026		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
No.ofclassesrequiredtocompleteUNIT-III:15(Lecture: 06,Practice: 09)			**No. of classes taken (includingPractice):**					

UNIT-IV: SECTIONS OF SOLIDS&DEVELOPMENT OF SURFACES:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
21	Introduction to Sections of Solids and Development of Surfaces: Perpendicular and inclined section planes	2	20-04-2026		TLM 1, 2	**CO 4**	**T1, R1 to R5**	
22	Sectional views and True shape of section, Practice	3	21-04-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
23	Sections of solids in simple position only, Numericals	2	27-04-2026		TLM 1, 2	**CO 4**	**T1, R1 to R5**	
24	**Development of Surfaces:** Introduction to Methods of Development of Surfaces, Parallel Line Development (Plane Surfaces), Practice	3	28-04-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
25	Radial Line Development, Numericals	2	04-05-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
26	Practice	3	05-05-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
No.ofclassesrequiredtocompleteUNIT-IV:20(Lecture: 06,Practice: 14)			**No. of classes taken (includingPractice):**					

UNIT-V: CONVERSION VIEWS &COMPUTER GRAPHICS:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
27	Introduction to Isometric Views, Isometric Views of Planes, Solids	2	11-05-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
28	Conversion of isometric views to orthographic views, Practice	3	12-05-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
29	Conversion of isometric views to orthographic views; Conversion of orthographicviews to isometric views	2	01-06-2026		TLM 1, 2	**CO 5**	**T1, R1 to R5**	
30	Practice	3	02-06-2026		TLM 1, 2, 3	**CO 5**	**T1, R1 to R5**	
31	**Computer Graphics**: Creating 2D&3D drawings of objects, including PCB and Transformations using Auto CAD	2	08-06-2026		TLM 1, 2	**CO 5**	**T1, R1 to R5**	
32	Practice	3	09-06-2026		TLM 1, 2, 3	**CO 5**	**T1, R1 to R5**	
No.ofclassesrequiredtocompleteUNIT- V:10(Lecture: 04,Practice: 06)			**No. of classes taken (includingPractice):**					
Summer Vacation: 18-05-20026 to 30-05-2026; II Mid Examinations: From 15-06-20026 to 20-06-2026 (Covered CO 3, CO 4 & CO 5)								

Teaching Learning Methods:

TLM1: ChalkandTalk	**TLM2:** PPT	**TLM3:** Tutorial	**TLM4:** Demonstration(Lab/FieldVisit)	
TLM5: ICT (NPTEL/SwayamPrabha/MOOCS)		**TLM6:** GroupDiscussion/Project		

PART-C

EVALUATION PROCESS for EG Course (R23 Regulation):

Evaluation Task	Marks
I-Descriptive Examination (Units-I, II)	M1=15
II- Descriptive Examination (UNITs -III, IV & V)	M2=15
Day – to – Day Evaluation (UNITs - I, II, III, IV & V)	DDE=15
Mid Marks for 80% of Max (M1, M2) + 20% of Min (M1, M2)	M=15
Cumulative Internal Examination (CIE): M+ DDE	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

ACADEMIC CALENDAR - B.Tech - II Semester (R23):

Commencement of Class work		**02-02-2026**	
Description	**From**	**To**	**Weeks**
I Phase of Instructions	02-02-2026	21-03-2026	7 Weeks
I Mid Examinations	23-03-2026	28-03-2026	1 Week
II Phase of Instructions	30-03-2026	16-05-2026	7 Weeks
Summer Vacation	18-05-2026	30-05-2026	2 Weeks
II Phase of Instructions (Contd..)	01-06-2026	13-06-2026	2 Weeks
II Mid Examinations	15-06-2026	20-06-2026	1 Week
Preparation and Practicals	22-06-2026	27-06-2026	1 Week
Semester End Examinations	29-06-2026	11-07-2026	2 Weeks
Commencement of Next (II) Semester Class Work		**13-07-2026**	

Class Time Table - B.Tech – I I Sem: CSE(AI&ML) B - Section (R23)

↓Day/Date→	**09.00 – 10.00**	**10.00 – 11.00**	**11.00 – 12.00**	**12.00 – 13.00**	**13.00 – 14.00**	**14.00 – 15.00**	**15.00 – 16.00**
Monday		**Engineering Graphics (CSM – B)**		**LUNCH BREAK**			
Tuesday					**Engineering Graphics (CSM – B)**		
Wednesday							
Thursday							
Friday							
Saturday							

Day – to – Day work / Submission of Sheets

S.No	Unit No	Course Outcome	Sheet No. and Content
1	**I**	**CO 1**	1. Geometrical Constructions, Engineering Curves: Ellipse, Parabola, Hyperbola 2. Construction of Cycloids, involutes 3. Projections of Points
2	**II**	**CO 2**	4. Projections of straight lines 5. Projections of Planes
3	**III**	**CO 3**	6. Projections of Solids
4	**IV**	**CO 4**	7. Sections of Solids 8. Development of Surfaces
5	**V**	**CO 5**	9. Isometric views of simple solids, conversion of Isometric views to Orthographic Projections 10. Conversion of Orthographic Projections to Isometric Views

PART-D

Program Educational Objectives (PEOs):

PEO1: Pursue higher education, entrepreneurship and research to compete at global level.

PEO2: Design and develop products innovatively in the area of computer science and engineering and in other allied fields.

PEO3: Function effectively as individuals and as members of a team in the conduct of interdisciplinary projects; and even at all the levels with ethics and necessary attitude.

PEO4: Serve ever-changing needs of the society with a pragmatic perception.

Program 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.

PO3 - 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.

PO4 - 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.

PO5 - 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.

PO6 - 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.

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 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and Team Work: 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 ring 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.

PO12 - 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.

Program Specific Outcomes (PSOs):

PSO1: The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization.

PSO2: The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.

PSO3: To inculcate an ability to analyze, design and implement database applications.

Signature				
Name of the Faculty	Mr. S.SRINIVASA Reddy	Mr. J. Subba Reddy	Mr. J. Subba Reddy	Dr. S. JAYAPRADA
Designation / Title	Sr,Asst, Professor / Course Instructor	Associate Professor / Course Coordinator	Associate Professor/ Module Coordinator	Professor / Head of the Department

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (AI&ML)

COURSE HANDOUT

PART-A

Name of Course Instructor : JAGADEESWARA RAO P
Course Name & Code : DATA STRUCTURES & 23CS02
L-T-P Structure : 0-0-3 **Credits:** 1.5
Program/Sem/Sec : B.Tech./II/B-SEC **A.Y.:** 2025-26

PREREQUISITE: C Programming Language

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The objective of the course is to make students familiar with writing algorithms to implement different data structures like stacks, queues, trees and graphs, and various sorting techniques.

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

CO1	Understand the role of linear and nonlinear data structures in organizing and accessing data **(Understand)**
CO2	Implement abstract data type (ADT) and data structures for given application. **(Apply)**
CO3	Design algorithms based on techniques like linked list, stack, queue, trees etc. **(Apply)**
CO4	Apply the appropriate linear and nonlinear data structure techniques for solving a problem. **(Apply)**
CO5	Design hash-based solutions for specific problems. **(Apply)**

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	2	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	2	2	1	-	-	-	-	-	-	-	-	2	-	-
CO3	3	2	2	1	-	-	-	-	-	-	-	-	2	-	-
CO4	3	2	2	1	-	-	-	-	-	-	-	-	2	-	-
CO5	3	2	2	1	-	-	-	-	-	-	-	-	2	-	-
1 - Low						**2** –Medium						**3** - High			

TEXTBOOKS:

T1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2 nd Edition.

T2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan AndersonFreed, Silicon Press, 2008

REFERENCE BOOKS:

R1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders

R2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft

R3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum

R4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein

R5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Linear Data 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
1.	Introduction and Discussion of CO's	1	02-02-2026		TLM1	
2.	Definition and Importance of Linear Data Structures	1	03-02-2026		TLM1	
3.	Abstract Data Types and Implementation	1	06-02-2026		TLM1	
4.	Overview of time and space complexity	1	07-02-2026		TLM1	
5.	Analysis of Liner Data structures	1	09-02-2026		TLM1	
6.	Revise Arrays - Tutorial	1	10-02-2026		TLM3	
7.	Searching Techniques: Linear Search	1	13-02-2026		TLM1	
8.	Binary Search & Analysis	1	14-02-2026		TLM1	
9.	Bubble Sort & Analysis	1	16-02-2026		TLM1	
10.	Insertion Sort & Analysis	1	17-02-2026		TLM1	
11.	Revise Searching & Sorting - Tutorial	1	20-02-2026		TLM3	
12.	Selection Sort & Analysis	1	21-02-2026		TLM1	
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: Linked Lists

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	List Implementation using Arrays and Array Disadvantages	1	23-02-2026		TLM1	
14.	Linked List Representation	1	24-02-2026		TLM1	
15.	Sing Linked List: Operations	2	27-02-2026 28-02-2026		TLM1	
16.	Single Linked List - Tutorial	1	02-03-2026		TLM3	
17.	Double Linked List: Operations	2	06-03-2026 07-03-2026		TLM1	
18.	Circular Single Linked List	1	09-03-2026		TLM1	
19.	Circular Double Linked List	1	10-03-2026		TLM1	
20.	Comparing Arrays and Linked List	1	13-03-2026		TLM1	
21.	Applications for Linked Lists: Polynomial Representation	1	16-03-2026		TLM1	
22.	Linked List - Tutorial	1	17-03-2026		TLM3	

23.	Polynomial Addition	1	20-03-2026		TLM1	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: Stacks

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.	Introduction to Stacks: Properties	1	30-03-2026		TLM1	
25.	Operations of Stacks	1	31-03-2026		TLM1	
26.	Implementation of stacks using arrays	1	04-04-2026		TLM1	
27.	Stacks using Linked List	1	06-04-2026		TLM1	
28.	Expressions: Expression evaluation	1	07-04-2026		TLM1	
29.	Stack & its Operations - Tutorial	1	10-04-2026		TLM3	
30.	Infix to Postfix Conversion	2	13-04-2026 17-04-2026		TLM1	
31.	Checking Balanced Parenthesis	1	18-04-2026		TLM1	
32.	Applications for Stack - Tutorial	1	20-04-2026		TLM3	
33.	Reversing a List	1	21-04-2026		TLM1	
34.	Backtracking	1	24-04-2026		TLM1	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: Queues

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
35.	Introduction to queues: properties and operations,	1	25-04-2026		TLM1	
36.	Implementing queues using arrays	1	27-04-2026		TLM1	
37.	Implementing queues using Linked List	1	28-04-2026		TLM1	
38.	Applications of Queue: Scheduling	1	01-05-2026		TLM1	
39.	Breadth First Search	1	02-05-2026		TLM1	
40.	Circular Queue	2	04-05-2026 05-05-2026		TLM1	
41.	Double ended queue	1	08-05-2026		TLM1	
42.	Queue - Tutorial	1	09-05-2026		TLM3	
43.	Applications of Deque	1	11-05-2026		TLM1	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: TREES & HASHING TECHNQIUES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
44.	Introduction to Trees,	1	12-05-2026		TLM1	
45.	Representation of Trees	1	15-05-2026		TLM1	
46.	Tree Traversals	1	16-05-2026		TLM1	
47.	Binary Search Trees-Operations	1	01-06-2026		TLM1	
48.	Hashing Introduction, Hash Functions	1	02-06-2026		TLM1	
49.	Collison Resolution Techniques: Separate Chaining	1	05-06-2026		TLM1	
50.	Trees & Hashing - Tutorial	1	06-06-2026		TLM3	
51.	Open Addressing: Linear Probing	1	08-06-2026		TLM1	
52.	Quadratic Probing, Double Hashing	1	09-06-2026		TLM1	
53.	Rehashing, Applications of Hashing	1	12-06-2026		TLM1	
54.	Revision	1	13-06-2026		TLM1	
No. of classes required to complete UNIT-V: 11				**No. of classes taken:**		

Content Beyond 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	Textbook followed	HOD Sign
1.	Evaluation of Prefix Expression	1	19-04-2024					
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (15-06-2026 TO 20-06-2026)								

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	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 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 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	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and teamwork**: 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	Design and develop sophisticated software systems, leveraging expertise in data structures, algorithm analysis, web design, and proficiency in machine learning techniques.
PSO 2	Possess strong data analysis and interpretation skills, enabling them to extract meaningful insights and patterns from large datasets using AI & ML methodologies.
PSO 3	To develop innovative AI and machine learning solutions that strategically leverage data-driven and technical expertise to effectively solve complex, real-world problems.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. P Jagadeeswara Rao**	**Dr. Y. Vijaya Bhaskar Reddy**	**Dr. Y. Vijaya Bhaskar Reddy**	**Dr. S Jayaprada**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT
PART-A

Course Instructor	**:** P. Vijaya Sirisha/Dr. P. Sobhanachalam	
Course Name & Code	**:** Engineering Physics Lab & 23FE053	**Credits:** 1
L-T-P Structure	**:** 0-0-**3**	**A.Y.:** 2025-26
Program/Sem./Branch	: B.Tech/I/CSM B	**Regulations**: R23

Course Objective: To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

Course Outcomes:

CO1: Analyze the wave properties of light using optical instruments **(Apply-L3).**
CO2: Estimate the elastic moduli of various materials and acceleration due to gravity **(Apply-L3)**.
CO3: Demonstrate the vibrations in stretched strings **(Understand-L2)**.
CO4: Evaluate dielectric constant and magnetic field of circular coil carrying current **(Apply-L3)**.
CO5: Examine the characteristics of semiconductor devices **(Apply-L3)**.

Course Articulation Matrix (Correlation between COs, Pos & PSOs):

Course Designed by				Division of Physics, Freshman Engineering Department								
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	2	1	-	-	-	1	1	-	-	1
CO2	3	3	2	1	-	-	-	1	1	-	-	1
CO3	3	3	2	1	-	-	-	1	1	-	-	1
CO4	3	3	2	1	-	-	-	1	1	-	-	1
CO5	3	3	2	1	-	-	-	1	1	-	-	1
1 = Slight (Low)				**2** = Moderate (Medium)				**3** = Substantial (High)				

List of Experiments

1. Determination of radius of curvature of a given Plano - Convex lens by Newton's rings.
2. Determination of dielectric constant using charging and discharging method.
3. Determination of wavelength of a laser light using diffraction grating.
4. Magnetic field along the axis of a current carrying circular coil by Stewart Gee's Method.
5. Determination of temperature coefficients of a thermistor.
6. Determination of acceleration due to gravity and radius of Gyration by using a compound
7. pendulum.
8. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.
9. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
10. Sonometer- Verification of laws of a stretched string.
11. Determination of energy band gap of a semiconductor using p-n junction diode.
12. Verification of Brewster's Law.
13. Determination of Hall coefficient and Hall voltage.

References:

T1: A Textbook of Practical Physics – S. Balasubramanian, M.N. Srinivasan, *S. Chand publishers,* 2017.
T2: BOS Approved Textbook**:** Lab Manual Prepared by LBRCE.

EVALUATION PROCESS

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

PART-B

Course Delivery Plan (Lesson Plan): ASE

S.No.	**Topics to be covered**	**No. of Classes Required**	**Tentative Date of Completion**	**Actual Date of Completion**	**T-L Methods**	**Learning Outcome COs**	**Textbook followed**	**HOD Sign**
1.	Introduction	3	06-02-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
2.	Demonstration	3	13-02-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
3.	Experiment 1	3	20-02-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
4.	Experiment 2	3	27-02-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
5.	Demonstration	3	06-03-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
6.	Experiment 3	3	13-03-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
7.	Experiment 4	3	20-03-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
8.	Experiment 5	3	10-04-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
9	**MID-1 Exam**	3	17-04-2026		---	---	---	
10.	Experiment 6	3	24-04-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
11.	Experiment 7	3	01-05-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
12.	Experiment 8	3	08-05-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
13.	Repetition	3	15-05-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
14.	Experiment 9 (Virtual Lab)	3	05-06-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
15.	Experiment10 (Virtual Lab)	3	12-06-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
16.	Revision	3	06-06-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	
17.	Internal Exam	3	13-06-2026		TLM-4	CO1, CO2, CO3, CO4 & CO5	T1	

Teaching-Learning Methods			
TLM-1	Chalk and talk	**TLM-4**	Demonstration (Lab/Field Visit)
TLM-2	PPT/A illustrations	**TLM-5**	ICT (NPTEL/Swayam Prabha /MOOCS)
TLM-3	Tutorial/Quiz/Assignment	**TLM-6**	Group Discussion/Project

PROGRAM OUT COMES (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 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 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.

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
P.Vijaya Sirisha	Dr. S. Yusuf	Dr. S. Yusuf	Dr. T. Satyanarayana

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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Phone: 08659-222933, **Fax**: 08659-222931

DEPARTMENT OF ECE

LAB HANDOUT

PART-A

Date: 02-02-2026

Name of Course Instructor : Mr. N.Dharmachari,Mrs.B.Rajeswari
Mr.Sivasankara rao.Mr.Ch.Siva ramakrishna

Course Name & Code : Electrical & Electronics Engineering Workshop (E & EE WS)

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

Program/Sem : B.Tech., CSM-B., II Sem **A.Y.** : 2025-26

PREREQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

To impart knowledge on the principles of digital electronics and fundamentals of electron devices & its applications.

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 & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	2						2	3	2		1				
CO2	2	2		2				2	2	2						
CO3	2	2	2	2				2	2	2				2		
CO4	2	2		3				2	3	2		1	2			
CO5	3	2			2			2	2	2	1	1	2	2	3	2
CO6	3	3		2	2			2	3	3		1			3	
1 - Low **2 –**Medium **3 -** High																

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

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 (Function Generators, CRO, RPS, Breadboard etc), Course Objectives and Outcomes.	3	02-02-2026		TLM4	
2.	Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.	3	09-02-2026		TLM4	
3.	Plot V – I characteristics of Zener Diode and its application as voltage Regulator.	3	16-02-2026		TLM4	
4.	Implementation of half wave and full wave rectifiers	3	23-02-2026		TLM4	
5.	Plot Input & Output characteristics of BJT in CB configuration-04	3	02-03-2026		TLM4	
6.	Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs	3	09-03-2026		TLM4	
7.	Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs	3	16-03-2026		TLM4	
8.	Internal Lab Examination (**Electronics**)	3	30-03-2026		TLM4	
9.	Verification of KCL and KVL	3	06-04-2026		TLM4	
10.	Verification of Superposition Theorem	3	13-04-2026		TLM4	
11.	Measurement of Resistance using Wheat stone bridge	3	20-04-2026		TLM4	
12.	Magnetization Characteristics of DC Shunt Generator	3	27-04-2026		TLM4	
13.	Measurement of Power and Power factor using Single-phase wattmeter	3	04-05-2026		TLM4	
14.	Calculation of Electrical Energy for Domestic Premises	3	11-04-2026		TLM4	
15.	Reserve Day	3	01-06-2026		TLM4	
16.	Internal Lab Examination (**Electricals**)	3	08-06-2026		TLM4	
No. of classes required: 45				**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.
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 a	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO b	Design and analyze electrical machines, modern drive and lighting systems
PSO c	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO d	Design controllers for electrical and electronic systems to improve their performance.

Date: 02-02-2026

Course Instructors	Course Coordinator	Module Coordinator	Head of the Department
Mr. N.Dharmachari, Mrs.B.Rajeswari, Mr.Sivasankara rao, Mr.Ch.Siva ramakrishna	Dr. AVGA Marthanda	Dr. G.Nageswara Rao	Dr. G.Srinivasulu

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DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech. II-Sem, C S E (AI&ML)-B/S

ACADEMIC YEAR : 2025-26

COURSE NAME & CODE : Engineering Workshop, 23ME51

L-T-P STRUCTURE : 0-0-3

COURSE CREDITS : 1.5

COURSE INSTRUCTOR : Dr.S.Rami Reddy, S r . Asst. Professor,
S. Uma Maheswara Reddy, Asst Professor

COURSE COORDINATOR : Seelam Srinivasa Reddy, Assoc. Professor

PRE REQUISITE: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

COURSE OBJECTIVE:

The objective of this course is to get familiarized with various trades used in Engineering Workshop and learn the safety pre-cautions to be followed in the workshops, while working with the different tools.

COURSE OUTCOMES (CO)

CO1	Design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint.
CO2	Fabricate and model various basic prototypes in the trade of fitting such as Straight fit, V-fit.
CO3	Produce various basic prototypes in the trade of Tin smithy such as Rectangular tray, and open Cylinder.
CO4	Perform various basic House Wiring techniques.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3		2	3	3	3			3			2		3	2
CO2	3		2	3	3	3			3			2		3	2
CO3	3		2	3	3	3			3			2		3	2
CO4	3		2	3	3	3			3			2		3	2

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

REFERENCE:

R1	LabManual

COURSE DELIVERY PLAN (LESSON PLAN): Section-B (BATCH-B1)

S. No.	Experiment to be conducted	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Reference	HOD Sign Weekly
1	Demonstration	3	04/02/2026		TLM8	R1	
2	Experiment-1	3	11/02/2026		TLM8	R1	
3	Experiment-2	3	18/02/2026		TLM8	R1	
4	Experiment-3	3	25/02/2026		TLM8	R1	
5	Experiment-4	3	04/03/2026		TLM8	R1	
6	Experiment-5	3	11/03/2026		TLM8	R1	
7	Experiment-6	3	18/03/2026		TLM8	R1	
I-Mid Examinations (23.03.2026 to 28.03.2026)							
8	Experiment-7	3	01/04/2026		TLM8	R1	
9	Experiment-8	3	08/04/2026		TLM8	R1	
10	Repetition lab	3	15/04/2026		TLM8	R1	
11	Repetition lab	3	22/04/2026		TLM8	R1	
12	Repetition lab	3	29/04/2026		TLM8		
13	Viva voce	3	06/05/2026		TLM6		
14	Viva voce	3	13/05/2026		TLM6		
15	Viva voce	3	00/06/2026		TLM6		
16	Lab Internal	3	10/06/2026				

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	02-01-2026	21-03-2026	7W
I Mid Examinations	**23-03-2026**	**28-03-2026**	1W
II Phase of Instructions	30-03-2026	16-05-2026	7W
Summer vacation	18-05-2026	30-05-2026	2W
II Phase of Instructions	01-06-2026	13-06-2026	2W
II Mid Examinations	**15-06-2026**	**20-06-2026**	1W
Preparation and Practical's	22-06-2026	27-06-2026	1W
Semester End Examinations	29-06-2026	11-07-2026	2W

Part-C

EVALUATION PROCESS:

Parameter	Marks
Day–to–Day Work	A1=10 Marks
Record And Observation	B1= 05 Marks
Internal Test	C1 = 15 Marks
Cumulative Internal Examination (CIE = A1 + B1 + C1)	A1+B1+C1=30Marks
Semester End Examinations (SEE)	D1 = 70 Marks
Total Marks : A1+B1+C1+D1	100 Marks

Details of Batches: A-SEC

Batch No.	Reg.No.of Students	Number of Students
B1	25761A4263-4278	16
B2	25761A4279-4294	16
B3	25761A4295-42B0	16
B4	25761A42B1-42C6	16

Batch No:	Exp. 01	Exp. 02	Exp. 03	Exp. 04	Exp. 05	Exp. 06	Exp. 07	Exp. 08
B1	C1	C2	F1	F2	P1	P2	E1	E2
B2	C2	C1	F2	F1	P2	P1	E2	E1
B3	F1	F2	C1	C2	E1	E2	P1	P2
B4	F2	F1	C2	C1	E2	E1	P2	P1

LIST OF EXPERIMENTS:

Exp. No.	Name of the Experiment	Related CO
1.	Carpentry-1(C1)-Corner Bridle Joint	CO1
2.	Carpentry-2(C2)-Dove tail Joint	CO1
3.	Fitting-1(F1)-T-Joint	CO2
4.	Fitting-2(F2)-V-Joint	CO2
5.	Plumbing-1(P1)-Pipe Threading practice	CO3
6.	Plumbing-2(P2)-Pipe Layout	CO3
7.	House Wiring-1(E1)–Series and Parallel connection	CO4
8.	HouseWiring-2(E2)–Fluorescent Lamp and Calling Bell Circuit	CO4

NOTIFICATION OF CYCLE:

cycle	Exp. No.	Name of the Experiment	Related CO
Cycle 1	1.	Carpentry-1(C1)-Corner Bridle Joint	CO1
	2.	Carpentry-2(C2)-Dove tail Joint	CO1
	3.	Fitting-1(F1)-T-Joint	CO2
	4.	Fitting-2(F2)-V-Joint	CO2
	5.	Plumbing-1(P1)-Pipe Threading practice	CO3
Cycle 2	6.	Plumbing-2(P2)-PipeLayout	CO3
	7.	House Wiring-1(E1)–Series and Parallel Connection	CO4
	8.	House Wiring-2(E2)–Fluorescent Lamp and Calling bell Circuit	CO4

PROGRAMME EDUCATIONAL OBJECTIVES:

PEO1: To build a professional career and pursue higher studies with sound knowledge in Mathematics, Science and Mechanical Engineering.

PEO2: To inculcate strong ethical values and leadership qualities for graduates to become successful in multi disciplinary activities.

PEO3: To develop inquisitiveness towards good communication and lifelong learning.

PROGRAM OUT COMES (POs)

Engineering Graduates will be able to :

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyses complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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.
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.
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.
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.
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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multi disciplinary settings.
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 instruction

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 multi-disciplinary environments.

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):

1. To apply the principles of thermal sciences to design and develop various thermal systems.
2. To apply the principles of manufacturing technology, scientific management towards Improvement of quality and optimization of engineering systems in the design, analysis and manufacture ability of products.
3. To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Course Instructors	**Course Coordinator**	**Module Coordinator**	**HOD**
Dr.S.RamiReddy **S.Uma maheswara Reddy**	**S.Srinivasa Reddy**	**Mr.J.SubbaReddy**	**Dr. M. B. S Sreekara Reddy**

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (AI&ML)

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. P. Jagadeeswara Rao
Course Name & Code **:** DATA STRUCTURES LAB & 23CS52
L-T-P Structure **: 0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/CSE(AI&ML)/II/B **A.Y.:** 2025-26

PREREQUISITE: PPSC

COURSE EDUCATIONAL OBJECTIVE:
The objective of this course is to make students familiar with writing algorithms to implement different data structures like stacks, queues, trees and graphs, and various sorting techniques.

COURSE OUTCOMES (CO):
CO1: Apply Linear Data Structures for organizing the data efficiently **(Apply-L3)**
CO2: Apply Non- Linear Data Structures for organizing the data efficiently **(Apply-L3)**
CO3: Develop and implement hashing techniques for solving problems (**Apply - L3**)
CO4: Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	2	2	1	3	-	-	-	-	-	-	-	3	-	-
CO 2	3	2	2	1	3	-	-	-	-	-	-	-	3	-	-
CO 3	3	2	2	1	3	-	-	-	-	-	-	-	3	-	-
CO 4	-	-	-	-	-	-	-	2	2	2	2	2	-	-	-

Note: 1- Slight (Low), **2 -** Moderate (Medium), **3 -** Substantial (High)

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	HOD Sign
1.	Array Manipulations	3	05-02-2026		
2.	Searching and Sorting Techniques	3	12-02-2026		
3.	Single Linked List	3	19-02-2026		
4.	Double Linked List	3	26-02-2026		
5.	Circular Linked List	3	05-03-2026		
6.	Polynomial Representation & Polynomial Addition	3	12-03-2026		
7.	Linked List Applications	3	02-04-2026		
8.	Stack Implementation & Stack Applications	3	09-04-2026		
9.	Queue Implementation & Circular Queue	3	16-04-2026		
10.	Double Ended Queue	3	23-04-2026 30-04-2026		
11.	Trees	3	07-05-2026 14-05-2026		
12.	Hashing	3	04-06-2026		
13.	Internal Exam	3	11-06-2026		

PART-C

EVALUATION PROCESS (R23 Regulation):

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

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.
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PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and teamwork**: 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	Design and develop sophisticated software systems, leveraging expertise in data structures, algorithm analysis, web design, and proficiency in machine learning and image processing techniques.
PSO 2	Exhibit proficiency in designing and developing networking and embedded software solutions, employing knowledge of data communication, sensor applications, robotics, virtual reality, and Internet of Things (IoT).
PSO 3	Possess the strong data analysis and interpretation skills, enabling them to extract meaningful insights and patterns from large datasets using AI & ML methodologies.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. P Jagadeeswara Rao**	**Dr. Y. Vijaya Bhaskar Reddy**	**Dr. Y. Vijaya Bhaskar Reddy**	**Dr. S Jayaprada**
Signature				