LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

PROGRAM	**: B.Tech., II-Sem., CSM A**
ACADEMIC YEAR	**: 2024-25**
COURSE NAME & CODE	**: ENGINEERING PHYSICS**
L-T-P STRUCTURE	**: 3-1-0**
COURSE CREDITS	**: 3**
COURSE INSTRUCTOR	**: P VIJAYA SIRISHA**
PRE-REQUISITE	**: Nil**

COURSE EDUCATIONAL OBJECTIVES (CEOs): To bring 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

CO 1	**Analyze** the intensity of variation of light due to interference, diffraction and polarization
CO 2	**Understand** the basics of crystals and their structures
CO 3	**Summarize** various types of polarization of dielectrics and classify the magnetic material
CO 4	**Explain** the fundamentals of quantum mechanics and free electron theory of metals
CO5	**Identify** the type of semiconductor using Hall Effect

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)**												

BOS APPROVED TEXT BOOKS:

T1 : V. Rajendran, "*Engineering Physics*", TMH, New Delhi, 6th Edition, 2014.
T2 :M.N. Avadhanulu, P.G. Kshirsagar, "Engineering *Physics*", S. Chand &Co., 2nd Edition, 2014.

BOS APPROVED REFERENCE BOOKS:

R1: M.N. Avadhanulu, TVS Arun Murthy, "Applied *Physics*", S. Chand & Co., 2nd Edition, 2007.
R2 :P.K. Palani Samy, "*Applied Physics*", Sci. Publ. Chennai, 4th Edition, 2016.
R3 :P. Sreenivasa Rao, K Muralidhar, "*Applied Physics*", Him. Publi. Mumbai,1st Edition, 2016.
R4 :Hitendra K Mallik , AK Singh " *Engineering Physics*", TMH, New Delhi, 1st Edition, 2009.

WEB REFERENCES AND E-TEXT BOOKS

1. http://www.freebookcentre.net/Physics/Solid-State-Physics-Books.html
2. http://physicsdatabase.com/free-physics-books/
3. http://www.e-booksdirectory.com
4. http://www.thphys.physics.ox.ac.uk

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-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: WAVE OPTICS

Course Outcome :- CO 1; Text Book :- T1, R2

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Introduction to the Subject, Course Outcomes	1	22/01/2025		**TLM2**		
2.	Superposition of Coherence, Conditions for Interference	1	23/01/2025		**TLM1**		
3.	Interference from thin films	1	24/01/2025		**TLM1**		
4.	Newton's rings	1	25/01/2025		**TLM2**		
5.	Colours in thin films Applications		29/01/2025				

6.	Introduction – Diffraction, Types	1	30/01/2025		**TLM1**		
7.	Single slit diffraction	1	31/01/2025		**TLM2**		
8.	Double slit	1	01/02/2025				
9.	**N Slits**	1	05/02/2025		**TLM4**		
10.	**Diffraction grating**	1	06/02/2025		**TLM4**		
11.	TUTORIAL	1	07/02/2025		**TLM3**		
12.	Dispersive power & Resolving power of Grating	1	08/02/2025		**TLM3**		
13.	Polarization introduction	1	12/02/2025		**TLM1**		
14.	Polarization by reflection, refraction	1	13/02/2025		**TLM1**		
15.	Double refraction,	1	14/02/2025		**TLM1**		
16.	Nicol's prism	1	15/02/2025		**TLM1**		
17.	Half wave and quarter wave plate	1	19/02/2025		**TLM2**		
18.	problems	1	20/02/2025		**TLM1**		
No. of classes required to complete UNIT-I: 17				No. of classes taken:			

UNIT-II: CRYSTALLOGRAPHY AND X RAY DIFFRACTION

Course Outcome :- CO 2; Text Book :- T1, R2

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Crystallography Basic defnitions	1	21/02/2025		**TLM2**		
2.	Crystal systems	1	22/02/2025		**TLM1**		
3.	Bravais Lattices		27/02/2025		**TLM1**		
4.	Packing fraction of SC	1	28/02/2025		**TLM1**		
5.	BCC, FCC	1	01/03/2025		**TLM1**		
6.	Miller Indices, separation between (hkl) planes	1	05/03/2025		**TLM1**		
7.	Bragg's law	1	06/03/2025		**TLM2**		

8.	X-ray Diffractometer	1	07/03/2025		**TLM1**		
9.	Laue's method powder method	1	08/03/2025		**TLM1**		
10.	Mid 1	1	12/03/2025				
11.	Mid 1	1	13/03/2025				
12.	Mid 1	1	14/03/2025				
No. of classes required to complete UNIT-II: 09				No. of classes taken:			

UNIT-III: DIELECTRIC AND MAGNETIC MATERIALS

Course Outcome :- CO 3; Text Book :- T1, R2

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Basic Definitions Relation between electric vectors	1	19/03/2025		**TLM1**		
2.	Electronic polarization	1	20/03/2025		**TLM1**		
3.	Ionic & Orientation polarization	1	21/03/2025		**TLM1**		
4.	Local field,	1	22/03/2025		**TLM1**		
5	Clausius Mosotti equation, complex dielectric constant	1	26/03/2025		**TLM2**		
6	Frequency dependence of polarization Dielectric loss and problems	1	27/03/2025		**TLM1**		
7	Introduction to Magnetic parameters origin of magnetic moment	1	28/03/2025		**TLM1**		
8	Classification of magnetic materials – Dia, para & Ferro	1	29/03/2025		**TLM1**		
9	Classification of magnetic materials – Dia, para & Ferro Anti ferro and ferri	1	02/04/2025		**TLM2**		
10	Domain concept of ferromagnetismand domain walls	1	03/04/2025		**TLM2**		
11	Hysteresis curve	1	04/04/2025		**TLM1**		
12	soft and hard magnetic materials	1	09/04/2025				
No. of classes required to complete UNIT-III: 12				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	HOD Sign	Remarks
1.	Introduction quantum mechanics, DeBroglie hypothesis	1	10/04/2025		**TLM1**		
2.	Heisenberg uncertainty principle , Physical significance of wave function	1	11/04/2025		**TLM1**		
3.	Schrodinger time dependent & independent wave equations	1	12/04/2025		**TLM1**		
4.	Particle in a box	1	16/04/2025		**TLM1**		
5.	Classical free electron theory-postulates, Success & Failures	1	17/04/2025		**TLM2**		
6.	Quantum free electron theory, electrical conductivity	1	19/04/2025		**TLM1**		
7.	Tutorial	**1**	23/04/2025		**TLM3**		
8.	Fermi-Dirac distribution function-Temperature dependence	**1**	24/04/2025		**TLM2**		
9.	Density of states Fermi energy	**1**	25/04/2025		**TLM2**		
No. of classes required to complete UNIT-IV: 09				No. of classes taken:			

UNIT-V :SEMICONDUCTOR PHYSICS

Course Outcome :- CO 4; Text Book :- T2, R1

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Introduction -	1	26/04/2025		**TLM1**		
2.	Classification of semiconductors	1	30/04/2025		**TLM1**		
3.	Density of Intrinsic and semiconductors Electrons,	1	01/05/2025		**TLM1**		
4.	Holes	1	01/05/2025		**TLM1**		
5.	Density of Intrinsic and semiconductors Holes	1	02/05/2025		**TLM1**		
6.	Electrical conductivity and fermi level	1	03/05/2025		**TLM1**		
7.	Density of Extrinsic semiconductors P-Type	1	07/05/2025		**TLM1**		
8.	Tutorial	1	08/05/2025		**TLM2**		
9.	Density of Extrinsic semiconductors N Type	1	09/05/2025		**TLM1**		
10.	Drift and diffusion currents Einstein equation	1	10/05/2025		**TLM2**		
11.	Hall effect and applications	1	14/05/2025		**TLM1**		
12.	Problems	1	15/05/2025		**TLM1**		
13.	Revision	1	16/05/2025				
14.	Revision	1	17/05/2025				
No. of classes required to complete UNIT-V: 10				No. of classes taken:			

PART-C

EVALUATION PROCESS (R-20 Regulation):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I, II)	M-1=18
I-Quiz Examination (Units-I, II)	Q1=07
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III , IV & V)	M-2=18
II-Quiz Examination (Units-III, IV & V)	Q2=07
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M-1,M-2)+25% of Min(M-1,M-2)	M=18
Quiz Marks =75% of Max(Q-1,Q-2)+25% of Min(Q-1,Q-2)	Q=07
Cumulative Internal Examination (CIE): A+M+Q	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.

Course Instructor	Course Coordinator	Module Coordinator	HOD
P Vijaya Sirisha	**Dr. S. Yusub**	**Dr. S. Yusub**	**Dr. A. Rami Reddy**

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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:** I B. Tech., II-Sem.,AI&ML-A
ACADEMIC YEAR	**:** 2024-25
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.R. Kavitha
PRE-REQUISITES	**:** Basics of Vectors**,** Differentiation, Integration

COURSE EDUCATIONAL OBJECTIVES (CEOs):

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

COURSE OUTCOMES (COs)

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

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

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

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

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

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

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

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

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

BOS APPROVED TEXT BOOKS:

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

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

BOS APPROVED REFERENCE BOOKS:

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

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

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

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

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

Part-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to the course	1	20-01-2025		TLM2			
2.	Course Outcomes, Program Outcomes	1	21-01-2025		TLM2			

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
3.	Introduction to UNIT I	1	22-01-2025		TLM1	CO1	T1,T2	
4.	Linear Differential equation	1	23-01-2025		TLM1	CO1	T1,T2	
5.	Bernoulli's DE	1	24-01-2025		TLM1	CO1	T1,T2	
6.	Exact DE	1	27-01-2025		TLM1	CO1	T1,T2	
7.	Exact DE	1	28-01-2025		TLM1	CO1	T1,T2	
8.	Non-exact DE Type I	1	29-01-2025		TLM1	CO1	T1,T2	
9.	Non-exact DE Type II	1	30-01-2025		TLM1	CO1	T1,T2	
10.	TUTORIAL - I	1	31-01-2025		TLM3	CO1	T1,T2	
11.	Non-exact DE Type III	1	03-02-2025		TLM1	CO1	T1,T2	
12.	Non-exact DE Type IV	1	04-02-2025		TLM1	CO1	T1,T2	
13.	Newton's Law of cooling	1	05-02-2025		TLM1	CO1	T1,T2	
14.	Newton's Law of cooling	1	06-02-2025		TLM1	CO1	T1,T2	
15.	TUTORIAL - II	1	07-02-2025		TLM3	CO1	T1,T2	
16.	Law of natural growth and decay	1	10-02-2025		TLM1	CO1	T1,T2	
17.	Law of natural growth and decay	1	11-02-2025		TLM1	CO1	T1,T2	
18.	Electrical circuits	1	12-02-2025		TLM1	CO1	T1,T2	
No. of classes required to complete UNIT-I		16			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
19.	Introduction to UNIT II	1	13-02-2025		TLM1	CO1	T1,T2	
20.	Solving a homogeneous DE	1	14-02-2025		TLM1	CO1	T1,T2	
21.	Solving a homogeneous DE	1	17-02-2025		TLM1	CO1	T1,T2	
22.	Finding Particular Integral, P.I for e^{ax+b}	1	18-02-2025		TLM1	CO1	T1,T2	

23.	P.I for Cos bx, or sin bx	1	19-02-2025		TLM1	CO1	T1,T2	
24.	P.I for polynomial function	1	20-02-2025		TLM1	CO1	T1,T2	
25.	TUTORIAL - III	1	21-02-2025		TLM3	CO1	T1,T2	
26.	P.I for $e^{ax+b}v(x)$	1	24-02-2025		TLM1	CO1	T1,T2	
27.	P.I for $x^k v(x)$	1	25-02-2025		TLM1	CO1	T1,T2	
28.	Method of Variation of parameters	1	27-02-2025		TLM1	CO1	T1,T2	
29.	TUTORIAL - IV	1	28-02-2025		TLM3	CO1	T1,T2	
30.	Method of Variation of parameters	1	03-03-2025		TLM1	CO1	T1,T2	
31.	Simultaneous linear equations	1	04-03-2025		TLM1	CO1	T1,T2	
32.	L-C-R circuits	1	05-03-2025		TLM1	CO1	T1,T2	
33.	Simple Harmonic motion	1	06-03-2025		TLM1	CO1	T1,T2	
34.	TUTORIAL - V	1	07-03-2025		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-II		16			No. of classes taken:			

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

UNIT-III: Partial Differential Equations

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
35.	Introduction to Unit III	1	17-03-2025		TLM1	CO2	T1,T2	
36.	Formation of PDE by elimination of arbitrary constants	1	18-03-2025		TLM1	CO2	T1,T2	
37.	Formation of PDE by elimination of arbitrary functions	1	19-03-2025		TLM1	CO2	T1,T2	
38.	Solving of PDE	1	20-03-2025		TLM1	CO2	T1,T2	
39.	TUTORIAL – VI	1	21-03-2025		TLM3	CO2	T1,T2	
40.	Solving of PDE	1	24-03-2025		TLM1	CO2	T1,T2	
41.	Solving of PDE	1	25-03-2025		TLM1	CO2	T1,T2	
42.	Lagrange's Method	1	26-03-2025		TLM1	CO2	T1,T2	
43.	Lagrange's Method	1	27-03-2025		TLM1	CO2	T1,T2	
44.	TUTORIAL - VII	1	28-03-2025		TLM3	CO2	T1,T2	
45.	Homogeneous Linear PDE with constant coefficients	1	01-04-2025		TLM1	CO2	T1,T2	
46.	Homogeneous Linear PDE with constant coefficients	1	02-04-2025		TLM1	CO2	T1,T2	
No. of classes required to complete UNIT-III		12			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
47.	Introduction to UNIT IV	1	03-04-2025		TLM1	CO3	T1,T2	
48.	Vector Differentiation	1	04-04-2025		TLM1	CO3	T1,T2	
49.	Gradient	1	07-04-2025		TLM1	CO3	T1,T2	
50.	Directional Derivative	1	08-04-2025		TLM1	CO3	T1,T2	
51.	Directional Derivative	1	09-04-2025		TLM1	CO3	T1,T2	
52.	Divergence	1	10-04-2025		TLM1	CO3	T1,T2	
53.	TUTORIAL VIII	1	11-04-2025		TLM3	CO3	T1,T2	
54.	Curl	1	15-04-2025		TLM1	CO3	T1,T2	
55.	Problems	1	16-04-2025		TLM1	CO3	T1,T2	
56.	Solenoidal fields, Irrotational fields, potential surfaces	1	17-04-2025		TLM1	CO3	T1,T2	
57.	Solenoidal fields, Irrotational fields, potential surfaces	1	21-04-2025		TLM1	CO3	T1,T2	
58.	Laplacian, second order operators	1	22-04-2025		TLM1	CO3	T1,T2	
59.	Vector Identities	1	23-04-2025		TLM1	CO3	T1,T2	
60.	Vector Identities	1	24-04-2025		TLM1	CO3	T1,T2	
61.	TUTORIAL IX	1	25-04-2025		TLM3	CO3	T1,T2	
No. of classes required to complete UNIT-IV		15			No. of classes taken:			

UNIT-V: Vector Integration

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
62.	Introduction to Unit-V	1	28-04-2025		TLM1	CO4	T1,T2	
63.	Line Integral	1	29-04-2025		TLM1	CO4	T1,T2	
64.	Circulation	1	30-04-2025		TLM1	CO4	T1,T2	
65.	Work done	1	01-05-2025		TLM1	CO4	T1,T2	
66.	TUTORIAL - X	1	02-05-2025		TLM3	CO4	T1,T2	
67.	Surface Integral	1	05-05-2025		TLM1	CO4	T1,T2	
68.	Surface Integral	1	06-05-2025		TLM1	CO4	T1,T2	
69.	Flux	1	07-05-2025		TLM1	CO4	T1,T2	
70.	Green's Theorem	1	08-05-2025		TLM1	CO4	T1,T2	
71.	TUTORIAL - XI	1	09-05-2025		TLM3	CO4	T1,T2	
72.	Stoke's Thoerem	1	12-05-2025		TLM1	CO4	T1,T2	
73.	Divergence Theorem	1	13-05-2025		TLM1	CO4	T1,T2	
74.	TUTORIAL - XII	1	16-05-2025		TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-V		13			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
75.	Non-homogeneous Linear PDE with constant coefficients	2	14-05-2025 15-05-2025		TLM2	CO2	T1,T2	
No. of classes		2			No. of classes taken:			
II MID EXAMINATIONS (02-06-2025 TO 07-06-2025)								

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

PART-CEVALUATION PROCESS (R23 Regulation):

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

PART-D PROGRAMME OUTCOMES (POs):

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

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

Dr. K.Bhanu Lakshmi	**Dr. K.R. Kavitha**	**Dr. A. RAMI REDDY**	**Dr. A. RAMI REDDY**
Course Instructor	Course Coordinator	Module Coordinator	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

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. P. Rakesh Kumar

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

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

Program/Sem./Sec. : B.Tech/II/AI&ML-A Sec **A.Y.:** 2024-25

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

REFERENCE BOOKS:

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): AI&ML-A Section

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	21-01-2025		TLM1	
2.	Evolution of electronics, Vacuum tubes to nano electronics	1	24-01-2025		TLM1	
3.	Characteristics of PN Junction Diode	1	25-01-2025		TLM1	
4.	Zener Effect — Zener Diode and its Characteristics	1	25-01-2025		TLM1	
5.	Zener Effect — Zener Diode and its Characteristics	1	28-01-2025		TLM1	
6.	Bipolar Junction Transistor	1	31-01-2025		TLM1	
7.	Bipolar Junction Transistor	1	04-02-2025		TLM1	
8.	CB Configurations and Characteristics	1	07-02-2025		TLM2	
9.	CE,CC Configurations and Characteristics.	1	08-02-2025		TLM2	
10.	Elementary Treatment of Small Signal CE Amplifier.	1	08-02-2025		TLM1	
No. of classes required to complete UNIT-I: 10				**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
11.	**Rectifiers and power supplies**: Block diagram description of a DC power supply	1	11-02-2025		TLM1	
12.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	14-02-2025		TLM1	
13.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	15-02-2025		TLM1	
14.	Working of simple Zener voltage regulator.	1	15-02-2025		TLM1	
15.	**Amplifiers**: Block diagram of Public Address system	1	18-02-2025		TLM2	
16.	Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response.	1	21-02-2025		TLM2	
17.	**Electronic Instrumentation:** Block diagram of an electronic instrumentation system.	1	22-02-2025		TLM2	
No. of classes required to complete UNIT-II: 07				**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	22-02-2025		TLM1	
19.	Logic gates including Universal Gates,	1	25-02-2025		TLM2	
20.	BCD codes, Excess-3 code, gray code	1	28-02-2025		TLM1	
21.	Hamming code, Boolean	1	04-03-2025		TLM2	

	Algebra, Basic Theorems and properties of Boolean Algebra					
22.	Simple combinational circuits	1	07-03-2025		TLM1	
23.	Half and Full Adders, Introduction to sequential circuits, Flip flops,	1	08-03-2025		TLM1	
24.	Registers and counters	1	08-03-2025		TLM2	
No. of classes required to complete UNIT-III: 07				**No. of classes taken:**		

I Mid Examinations: 10-03-2025 to 15- 03-2025

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

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-IV, V & UNIT-VI)	A1=5
I-Descriptive Examination (Units-IV, V & UNIT-VI)	M1=15
I-Quiz Examination (Units-IV, V & UNIT-VI)	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-I , II & III)	M2=15
II-Quiz Examination (UNIT-I , II & III)	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	13-01-2025	08-03-2025	8W
I Mid Examinations	10-03-2025	15-03-2024	1W
II Phase of Instructions	17-03-2025	17-05-2025	9W
II Mid Examinations	02-06-2025	07-06-2025	1W
Preparation and Practicals	09-06-2025	14-06-2025	1W
Semester End Examinations	16-06-2025	28-06-2025	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.
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PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities

	with an understanding of the limitations
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.
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PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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: 11-01-2025

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Dr. P. Rakesh Kumar	Dr. P. Rakesh Kumar	Dr. T. Satyanarayana	Dr. G. Srinivasulu

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)

COURSE HANDOUT
PART-A

Name of Course Instructor(s): **Mr. Jonnala Subba Reddy (T668),**
Mr. S. Srinivasa Reddy (T808), Dr. S. Rami Reddy (T589)

Course Name & Code	**:** Engineering Graphics – 23ME01	**Regulations**	**:** R23
L-T-P Structure	**:** 2 – 0 - 4	**Credits**	**:** 03
Program/Sem/Sec	: B.Tech/II SEM CSE (AI&ML) - A Section	**A.Y.**	**:** 2024-25
PREREQUISITE	**:** Engineering Physics, 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, Engineering Drawing, 51th Revised and Enlarged Edition, Charotar publishers,2012

REFERENCE BOOKS:

R1 Narayana K L, Kannaiah P, Textbook on Engineering Drawing, 2nd Edition, SciTechpublishers.
R2 R.K.Dhawan, Engineering Drawing, S.Chand Company LTD.
R3 Venugopal, Engineering Drawing and Graphics, New Age publishers
R4 Dhananjay A. Jolhe, Engineering Drawing, Tata McGraw Hill Publishers
R5 N.S.Parthasarathy, Vela Murali, Engineering Drawing, Oxford Higher Education

COURSE DELIVERY PLAN (LESSON PLAN) **PART-B**

UNIT - I: INTRODUCTION, GEOMETRICAL CONSTRUCTIONS, SCALES, CONICS, CYCLOIDS, INVOLUTES, ORTHOGRAPHIC PROJECTIONS OF POINTS

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, POs and PEOs **UNIT I: INTRODUCTION:** Introduction to Engineering Drawing, Principles of Engineering Graphics,and their Significance	3	21-01-2025		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
02	Drawing Instruments and their use-Conventions in Drawing, Lines, Lettering, and Dimensioning – BIS Conventions, Practice	2	24-01-2025		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	3	28-01-2025		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
04	Engineering **Curves**: Conic Sections, Construction of Ellipse, Parabola, and Hyperbola by general method only	2	31-01-2025		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
05	Construction of Cycloids, Involutes, Normal and tangent to Curves, Practice	3	04-02-2025		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
06	**Orthographic Projections**: Reference plane, importance of reference lines or Plane, Practice	2	07-02-2025		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
07	Projections of a point situated in any one of the four quadrants, Practice	3	11-02-2025		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
No. of classes required to complete UNIT - I: 18 (Lecture:06 Practice: 12)			**No. of classes taken (including Practice):**					

UNIT-II: PROJECTIONS OF STRAIGHT 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
08	**Projections of straight lines:** Projections of straight lines parallel to both reference planes, perpendicular to one reference plane, and parallel to other reference planes, Practice	2	14-02-2025		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
09	Projections of lines inclined to one reference plane and parallel to the other reference plane, Practice	3	18-02-2025		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
10	Projections of Straight Line Inclined to both the reference planes, Practice	2	21-02-2025		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
11	**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	25-02-2025		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
12	Projections of planes inclined to both the reference planes, Practice	2	28-02-2025		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
13	Practice	3	04-03-2025		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
14	Practice	2	07-03-2025		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
-	**I Mid Examinations: From 10-03-2025 to 15-03-2025 (Covered CO 1 & CO 2)**							
No. of classes required to complete UNIT - II: 17 (Lecture:6 Practice: 11)			**No. of classes taken (including Practice):**					

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 simple positions: Axis perpendicular to HP, Practice	3	18-03-2025		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
16	Projections of solids in simple positions: Axis perpendicular to vertical plane and Axis parallel to both the reference planes	2	21-03-2025		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	3	25-03-2025		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
18	Numericals	2	28-03-2025		TLM 1, 2	**CO 3**	**T1, R1 to R5**	
19	Practice	3	01-04-2025		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
20	Practice	2	04-04-2025		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
No. of classes required to complete UNIT - III: 15 (Lecture:06 Practice: 09)			**No. of classes taken (including Practice):**					

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	3	08-04-2025		TLM 1, 2	**CO 4**	**T1, R1 to R5**	
22	Sectional views and True shape of section, Practice	2	11-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
23	Sections of solids in simple position only, Numericals	3	15-04-2025		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	2	18-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	

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
25	Radial Line Development, Numericals	3	22-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
26	Practice	2	25-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
27	Practice	3	29-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
28	Practice	2	02-05-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
No. of classes required to complete UNIT - IV: 20 (Lecture:08 Practice: 12)			**No. of classes taken (including Practice):**					

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
29	Introduction to Isometric Views, Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views	3	06-05-2025		TLM 1, 2	**CO 5**	**T1, R1 to R5**	
30	Practice	2	09-05-2025		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	3	13-05-2025		TLM 1, 2	**CO 5**	**T1, R1 to R5**	
32	Practice	2	16-05-2025		TLM 1, 2, 3	**CO 5**	**T1, R1 to R5**	
No. of classes required to complete UNIT - V: 10 (Lecture:04 Practice: 06)			**No. of classes taken (including Practice):**					
II Mid Examinations: From 02-06-2025 to 07-06-2025 (Covered CO 3, CO 4 & CO 5)								

Teaching Learning Methods:

TLM1: Chalk and Talk	**TLM2:** PPT	**TLM3:** Tutorial	**TLM4:** Demonstration (Lab/Field Visit)		
TLM5: ICT (NPTEL/SwayamPrabha/MOOCS)		**TLM6:** Group Discussion/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 CALENDER - B.Tech - II Semester (R23):

Commencement of Class work		**13-01-2025**	
Description	**From**	**To**	**Weeks**
I Phase of Instructions	13-01-2025	08-03-2025	8 Weeks
I Mid Examinations	10-03-2025	15-03-2025	1 Week
II Phase of Instructions	17-03-2025	17-05-2025	9 Weeks
Summer Vacation	19-05-2025	31-05-2025	2 Weeks
II Mid Examinations	02-06-2025	07-06-2025	1 Week
Preparation and Practicals	09-06-2025	14-06-2025	1 Week
Semester End Examinations	16-06-2025	28-06-2025	2 Weeks
Commencement of Next (III) Semester Class Work		**30-06-2025**	

Class Time Table - B.Tech – II Sem: CSE (AI&ML) A - 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				**LUNCH BREAK**			
Tuesday	**Engineering Graphics**						
Wednesday							
Thursday							
Friday						**Engineering Graphics**	
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: 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 (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: Design and develop sophisticated software systems, leveraging expertise in data structures, algorithm analysis, web design, and proficiency in machine learning techniques.

PSO2: Possess the strong data analysis and interpretation skills, enabling them to extract meaningful insights and patterns from large datasets using AI & ML methodologies.

Signature				
Name of the Faculty	Mr. J. Subba Reddy	Mr. J. Subba Reddy	Mr. J. Subba Reddy	Dr. S. Jayaprada
Designation / Title	Associate 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 : 4-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech./II/A-SEC **A.Y.:** 2024-25

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, student 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	22-01-2025		TLM1	
2.	Definition and Importance of Linear Data Structures	1	23-01-2025		TLM1	
3.	Abstract Data Types and Implementation	1	24-01-2025		TLM1	
4.	Overview of time and space complexity	1	25-01-2025		TLM1	
5.	Analysis of Liner Data structures	2	29-01-2025 30-01-2025		TLM1	
6.	Revise Arrays	1	31-01-2025		TLM1	
7.	Searching Techniques: Linear Search	1	01-02-2025		TLM1	
8.	Binary Search & Analysis	2	05-02-2025 06-02-2025		TLM1	
9.	Bubble Sort & Analysis	1	07-02-2025		TLM1	
10.	Insertion Sort & Analysis	2	12-02-2025 13-02-2025		TLM1	
11.	Selection Sort & Analysis	2	14-02-2025 15-02-2025		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	19-02-2025		TLM1	
13.	Linked List Representation	1	20-02-2025		TLM1	
14.	Sing Linked List : Operations	2	21-02-2025 22-02-2025		TLM1	
15.	Double Linked List : Operations	1	27-02-2025		TLM1	
16.	Circular Single Linked List	1	28-02-2025		TLM1	
17.	Circular Double Linked List	1	01-03-2025		TLM1	
18.	Comparing Arrays and Linked List	1	05-03-2025		TLM1	
19.	Applications of Linked Lists: Polynomial Representation	1	06-03-2025		TLM1	
20.	Polynomial Addition	1	07-03-2025		TLM1	
No. of classes required to complete UNIT-II: 10				**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	19-03-2025		TLM1	
22.	Operations of Stacks	1	20-03-2025		TLM1	
23.	Implementation of stacks using arrays	1	21-03-2025		TLM1	
24.	Stacks using Linked List	1	22-03-2025		TLM1	
25.	Expressions: Expression evaluation	1	26-03-2025		TLM1	
26.	Infix to Postfix Conversion	1	27-03-2025		TLM1	
27.	Checking Balanced Parenthesis	1	28-03-2025		TLM1	
28.	Reversing a List	1	29-03-2025		TLM1	
29.	Backtracking	1	02-04-2025		TLM1	
No. of classes required to complete UNIT-III: 09				**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	03-04-2025		TLM1	
31.	Implementing queues using arrays	1	04-04-2025		TLM1	
32.	Implementing queues using Linked List	1	09-04-2025		TLM1	
33.	Applications of Queue : Scheduling	1	10-04-2025		TLM1	
34.	Breadth First Search	1	11-04-2025		TLM1	
35.	Circular Queue	2	16-04-2025 17-04-2025		TLM1	
36.	Double ended queue	2	19-04-2025 23-04-2025		TLM1	
37.	Applications of Deque	1	24-04-2025		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	25-04-2025		TLM1	
39.	Representation of Trees	1	26-04-2025		TLM1	
40.	Tree Traversals	1	30-04-2025		TLM1	
41.	Binary Search Trees-Operations	2	01-05-2025 02-05-2025		TLM1	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
42.	Hashing Introduction	1	03-05-2025		TLM1	
43.	Hash Functions	1	07-05-2025		TLM1	
44.	Collison Resolution Techniques: Separate Chaining	1	08-05-2025		TLM1	
45.	Open Addressing: Linear Probing	1	09-05-2025		TLM1	
46.	Quadratic Probing, Double Hashing	1	14-05-2025		TLM1	
47.	Rehashing	1	15-05-2025		TLM1	
48.	Applications of Hashing	1	16-05-2025		TLM1	
49.	Revision	1	17-05-2025		TLM1	
No. of classes required to complete UNIT-V: 13				**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	30-04-2025					
2.	Extendable Hashing	1	10-05-2025					
No. of classes		2			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 (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 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 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. S. Nagarjuna Reddy**	**Dr. Y.V.B Reddy**	**Dr. S Jayaprada**
Signature				

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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., II-Sem.,(CSM) / A

ACADEMIC YEAR : 2024-2025

COURSE NAME & CODE : ENGINEERING PHYSICS LAB

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

COURSE CREDITS : 1

COURSE INSTRUCTOR : **P.Vijaya Sirisha/ Dr P Sobhanacahalam**

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 Cos & POs, PSOs):

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- AI&DS

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	3	23-01-2025		**TLM4**	
2.	Demonstration	3	30-01-2025		**TLM4**	
3.	Experiment 1		06-02-2025		**TLM4**	
4.	Experiment 2	3	13-02-2025		**TLM4**	
5.	Experiment 3	3	20-02-2025		**TLM4**	
6.	Experiment 4	3	27-02-2025		**TLM4**	
7.	Experiment 5	3	06-03-2025		**TLM4**	
8.	MID -1	3	13-03-2025		**TLM4**	
9.	Demonstration	3	20-03-2025		**TLM4**	
10.	Experiment 6	3	27-03-2025		**TLM4**	
11.	Experiment 7	3	03-04-2025		**TLM4**	
12.	Experiment 8	3	10-04-2025		**TLM4**	
13.	Experiment 9	3	17-04-2025		**TLM4**	
14.	Experiment 10	3	24-04-2025		**TLM4**	
15.	**Internal Exam**	3	01-05-2025		**TLM4**	
16.	**Internal Exam**	3	08-05-2025		**TLM4**	
	No. of classes required to complete Syllabus:			48		

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

EVALUATION PROCESS:

Evaluation Task	Marks
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1.To Attain a solid foundation in Electronics & Communication Engineering fundamentals with an attitude to pursue continuing education.
2. To Function professionally in the rapidly changing world with advances in technology.
3. To Contribute to the needs of the society in solving technical problems using Electronics & Communication Engineering principles, tools and practices.
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.

P Vijaya Sirisha/ Dr P Sobhanachalam	Dr. S. Yusub	Dr. S. Yusub	Dr A. Rami Reddy
Course Instructor	Course Coordinator	Module Coordinator	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

Name of Course Instructor : Dr. P. Rakesh Kumar, Dr. B. Rambabu, Mr. N. Dharmachari, Ms. B. Lakshmi Thirupathamma

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

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

Program/Sem : B.Tech. AI&ML- II Sem-Sec A **A.Y.** : 2024-25

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): B.Tech. AI&ML- II Sem-Sec A

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	20-01-2025		TLM4	
2.	Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.	3	27-01-2025		TLM4	
3.	Plot V – I characteristics of Zener Diode and its application as voltage Regulator	3	03-02-2025		TLM4	
4.	Implementation of half wave and full wave rectifiers	3	10-02-2025		TLM4	
5.	Plot Input & Output characteristics of BJT in CB configuration	3	17-02-2025		TLM4	
6.	Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs / Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs	3	24-02-2025		TLM4	
7.	Internal Lab Examination (**Electronics**)	3	03-03-2025		TLM4	
No. of classes required: 21				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
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: 20-01-2025

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Dr. P. Rakesh Kumar	Mrs. B. Rajeswari	Dr. T. Satyanarayana	Dr. G. Srinivasulu

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Phone: 08659-222933, Fax: 08659-222931
DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. EESHWAR RAM J

Course Name &	**:** Engineering Workshop & 23ME51	**Regulation**	: R23
L-T-P Structure	**: 0-0-3**	**Credits**	: 1.5
Program/Sem/Sec	**:** B. Tech/II/CSM AI &ML	**A.Y.**	: 2024-25

PREREQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs): To familiarize students with wood working, sheet metal operations, fitting, electrical house wiring skills, and basic repairs of two-wheeler vehicles.

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

CO1	Identify workshop tools and their operational capabilities. **(Remember)**
CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding. **(Understand)**
CO3	Apply fitting operations in various applications. **(Apply)**
CO4	Apply basic electrical engineering knowledge for House Wiring Practice. **(Apply)**

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

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

Textbooks:

T1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.
T2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

R1. LBRCE Workshop Lab Manual.

R2. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007, 14th edition.

R3. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.

R4. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P.A.; Atul Prakash an, 2021-22.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

Si.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
	CYCLE-I					
1.	Introduction to Lab	3	22-01-2025		TLM4	
2.	Dove Tail Joint	3	29-01-2025		TLM4	
3.	Corner Lap Joint	3	05-02-2025		TLM4	
4.	T-Fitting	3	12-02-2025		TLM4	
5.	V-Fitting	3	19-02-2025		TLM4	
6.	Two Laps in Series and Parallel Connection with One Way Switch	3	05-03-2025		TLM4	
7.	Florescent Lamp and Calling Bell Circuit	3	19-03-2025		TLM4	
	CYCLE-II					
8.	Preparation of Pipe Layout	3	26-03-2025		TLM4	
9.	Pipe Threading	3	02-04-2025		TLM4	
10.	Preparation of Rectangular Tray	3	09-04-2025		TLM4	
11.	Preparation of Open Scoop	3	16-04-2025		TLM4	
12.	Preparation Of S-Hook	3	23-04-2025		TLM4	
13.	Preparation of chisel,	3	30-04-2025		TLM4	
14.	Repetition	3	07-05-2025		TLM4	
15.	Internal Lab Exam	3	14-05-2025		-----	
No. of classes required to complete				**No. of classes taken:**		

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

TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	To provide students with sound mathematical, engineering, and multidisciplinary knowledge to solve Aerospace and Allied Engineering
PEO 2	To prepare students to excel in higher education programs and to succeed in industry/academia profession.
PEO 3	To inculcate ethical attitude, leadership qualities, problem solving abilities and life-long learning for a successful professional career.

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

	Course Instructor		**Head of the Department**
Signature			
Name of the Faculty	Mr. EESHWAR RAM		Dr. J V RAO

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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/A **A.Y.:** 2024-25

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	20-01-2025		
2.	Searching and Sorting Techniques	3	27-01-2025		
3.	Single Linked List	3	03-02-2025		
4.	Double Linked List	3	10-02-2025		
5.	Circular Linked List	3	17-02-2025		
6.	Polynomial Representation & Polynomial Addition	3	24-02-2025		
7.	Linked List Applications	3	03-03-2025		
8.	Stack Implementation & Stack Applications	3	17-03-2025		
9.	Queue Implementation & Circular Queue	3	24-03-2025		
10.	Double Ended Queue	3	07-04-2025		
11.	Trees	3	21-04-2025		
12.	Hashing	3	28-04-2025		
13.	Lab Exercise Practice	3	05-05-2025		
14.	Internal Exam	3	12-05-2025		

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.
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 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. S. Nagarjuna Reddy**	**Dr. Y.V.B Reddy**	**Dr. S Jayaprada**
Signature				

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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

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

ACADEMIC YEAR : 2024-2025

COURSE NAME & CODE : Engineering Physics-23FE04

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr. S. YUSUF**

COURSE COORDINATOR : **Dr. S. YUSUF**

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): AIML-B

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	20-01-2025		TLM1	CO1	T1	
2.	Principle of superposition	1	21-01-2025		TLM1	CO1	T1	
3.	Interference of light, Interference in thin films by reflection reflection & applications	1	22-01-2025		TLM2	CO1	T1	
4.	colors in thin films	1	24-01-2025		TLM1	CO1	T1	
5.	Newton's rings	1	27-01-2025		TLM1	CO1	T1	
6.	ination of wavelength active index.	1	28-01-2025		TLM1	CO1	T1	
7.	DIFFRACTION: Introduction,	1	29-01-2025		TLM1	CO1	T1	
8.	Fresnel and Fraunhoffer diffractions	1	31-01-2025		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	03-02-2025		TLM1	CO1	T1	
10.	double slit & N slits (Qualitative)	1	04-02-2025		TLM1	CO1	T1	
11.	Diffraction Grating, Dispersive power	1	05-02-2025		TLM2	CO1	T1	
12.	Resolving power of Grating(Qualitative)	1	07-02-2025		TLM1	CO1	T1	
13.	Polarization : Introduction	1	10-02-2025		TLM1	CO1	T1	
14.	Types of polarization	1	11-02-2025		TLM1	CO1	T1	
15.	Polarization by reflection	1	12-02-2025		TLM1	CO1	T1	
16.	refraction & double refraction	1	14-02-2025		TLM2	CO1	T1	
17.	Nicol's prism	1	17-02-2025		TLM1	CO1	T1	
18.	half wave and quarter wave plates	1	18-02-2025		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	19-02-2025		TLM1	CO2	T1	
20	Lattice parameters, Bravais Lattices	1	21-02-2025		TLM2	CO2	T1	
21	Crystal Systems (3D)- Coordination number, Packing fraction of -SC	1	24-02-2025		TLM1	CO2	T1	
22	BCC, FCC	1	25-02-2025		TLM1	CO2	T1	
23	ndices, separation between ive (hkl) planes.	1	28-02-2025		TLM2	CO2	T1	
24	X–ray diffraction: Bragg's law; X–ray Diffractometer,	1	03-03-2025		TLM1	CO2	T1	
25	Structure determination by wder methods.	1	04-03-2025		TLM1	CO2	T1	

26	Revision	1	05-03-2025		TLM2	CO1, CO2		
27	Revision	1	07-03-2025		TLM2	CO1, CO2,		
28	I MID	1.5	10-03-2025			CO1, CO2,		
29	I MID	1.5	11-03-2025			CO1, CO2,		
30	I MID	1.5	12-03-2025			CO1, CO2,		
31	I MID	1.5	13-03-2025			CO1, CO2,		
32	I MID	1.5	14-03-2025			CO1, CO2,		
33	I MID	1.5	15-03-2025			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
34.	DIELECTRIC MATERIALS: Introduction	1	17-03-2025		TLM1	CO3	T1	
35.	Dielectric polarization- Dielectric polarizability, Susceptibility, Dielectric constant & Displacement Vector	1	18-03-2025		TLM2	CO3	T1	
36.	Relation between the electric vectors	1	19-03-2025		TLM1	CO3	T1	
37.	Types of polarizations- Electronic (Quantitative), ionic (Quantitative) & orientation polarizations	1	21-03-2025		TLM2	CO3	T1	

	(Qualitative)							
38.	Lorentz internal field	1	24-03-2025		TLM1	CO3	T1	
39.	Claussius-Mosotti equation	1	25-03-2025		TLM2	CO3	T1	
40.	ex dielectric constant – cy dependence of polariz tric loss.	1	26-03-2025		TLM1	CO3	T1	
41.	MAGNETIC MATERIALS : Introduction:	1	28-03-2025		TLM2	CO3	T1	
42.	Magnetic dipole moment – Magnetization- Magnetic susceptibility & permeability	1	01-04-2025		TLM2	CO3	T1	
43.	Atomic origin of magnetism	1	02-04-2025		TLM2	CO3	T1	
44.	Classification of magnetic materials- Dia, para, Ferro, anti-ferro & Ferri magnetic materials	1	04-04-2025		TLM1	CO3	T1	
45.	Domain concept for Ferromagnetism & Domain walls	1	07-04-2025		TLM2	CO3	T1	
46.	Hysteresis – soft and hard magnetic materials	1	08-04-2025		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
47.	QUANTUM MECHANICS: Dual nature of matter- Heisenberg's Uncertainty Principle	1	09-04-2025		TLM1	CO4	T1	
48.	significance & properties of wave function	1	11-04-2025		TLM2	CO4	T1	
49.	Schrodinger's time independent and dependent wave equations	1	14-04-2025		TLM2	CO4	T1	

50.	in a one –dimensional i l well.	1	15-04-2025		TLM1	CO4	T1	
51.	FREE ELECTRON THEORY: Classical free electron theory (Qualitative with discussion of merits and demerits)	1	16-04-2025		TLM2	CO4	T1	
52.	Quantum free electron theory	1	21-04-2025		TLM1	CO4	T1	
53.	electrical conductivity based on quantum free electron theory	1	22-04-2025		TLM2	CO4	T1	
54.	Fermi -Dirac distribution	1	23-04-2025		TLM2	CO4	T1	
55.	Density of states – Fermi energy	1	25-04-2025		TLM1	CO4	T1	
	V: SEMI CONDUCTORS							
56.	SEMI CONDUCTORS: Formation of energy bands	1	28-04-2025		TLM2	CO5	T1	
57.	classification of crystalline solids- Intrinsic semiconductors	1	29-04-2025		TLM1	CO5	T1	
58.	Density of charge carriers- Electrical conductivity- Fermi level -Extrinsic semiconductors	1	02-05-2025		TLM1	CO5	T1	
59.	Density of charge carriers	1	05-05-2025		TLM1	CO5	T1	
60.	dependence of Fermi energy on carrier concentration and temperature	1	06-05-2025		TLM1	CO5	T1	
61.	Drift and Diffusion Currents	1	07-05-2025		TLM1	CO5	T1	
62.	Einstein's equation	1	09-05-2025		TLM2	CO5	T1	

63.	Hall effect & its applic	1	12-05-2025		TLM1	CO5	T1	
64.	Revision	1	13-05-2025		TLM1		T1	
65.	Revision	1	14-05-2025		TLM1		T1	
66.	Revision	1	16-05-2025		TLM1		T1	
67.	Summer vacation		19-05-2025 to 31-05-2025					
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	13-05-2025		TLM1		R1	
69.	Conventional energy sources	1	14-05-2025		TLM1		R1	
75	Mid II	1	02-06-2025			CO3, CO4, CO5		
76	Mid II	1	03-06-2025			CO3, CO4, CO5		
77	Mid II	1	04-06-2025			CO3, CO4, CO5		
78	Mid II	1	05-06-2025			CO3, CO4, CO5		
79	Mid II	1	06-06-2025			CO3, CO4, CO5		
80	Mid II	1	07-06-2025			CO3, CO4, CO5		
81	Preparation and Practicals	09-06-2025 to 14-06-2025						
82	Semester end examinations	16-06-2025 to 28-06-2025						

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

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 Information Technology programme will be:

PEO 1: Pursue a successful career in the area of Information Technology or its allied fields. PEO 2: Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real world problems. PEO 3: Able to demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects. PEO 4: Able to understand the professional code of ethics and demonstrate ethical behaviour, effective communication, team work and leadership skills in their job.

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):

Graduate of the Information Technology will have the ability to

1.Organize, Analyze and Interpret the data to extract meaningful conclusions.
2.Design, Implement and Evaluate a computer-based systemto meet desiredneeds.
3. Develop IT application services with the help of different current engineering tools.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr. S. YUSUF	Dr. S. YUSUF	Dr. S. YUSUF	Dr. A. RAMI REDDY

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

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. P. Venkat Rao

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

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

Program/Sem./Sec. : B.Tech/II/AI&ML-B Sec **A.Y.:** 2024-25

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

REFERENCE BOOKS:

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): AI&ML-B Section

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	21-01-2025		TLM1	
2.	Evolution of electronics, Vacuum tubes to nano electronics	1	22-01-2025		TLM1	
3.	Characteristics of PN Junction Diode	1	24-01-2025		TLM1	
4.	Zener Effect — Zener Diode and its Characteristics	1	24-01-2025		TLM1	
5.	Zener Effect — Zener Diode and its Characteristics	1	28-01-2025		TLM1	
6.	Bipolar Junction Transistor	1	29-01-2025		TLM1	
7.	Bipolar Junction Transistor	1	31-01-2025		TLM1	
8.	CB Configurations and Characteristics	1	31-01-2025		TLM2	
9.	CE,CC Configurations and Characteristics.	1	04-02-2025		TLM2	
10.	Elementary Treatment of Small Signal CE Amplifier.	1	05-02-2025		TLM1	
No. of classes required to complete UNIT-I: 10				**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
11.	**Rectifiers and power supplies**: Block diagram description of a DC power supply	1	07-02-2025		TLM1	
12.	Working of full wave bridge rectifier	1	07-02-2025		TLM1	
13.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	11-02-2025		TLM1	
14.	Working of simple Zener voltage regulator.	1	12-02-2025		TLM1	
15.	**Amplifiers**: Block diagram of Public Address system	1	14-02-2025		TLM2	
16.	Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response.	1	14-02-2025		TLM2	
17.	**Electronic Instrumentation:** Block diagram of an electronic instrumentation system.	1	18-02-2025		TLM2	
No. of classes required to complete UNIT-II: 07				**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	19-02-2025		TLM1	
19.	Logic gates including Universal Gates,	1	21-02-2025		TLM2	
20.	BCD codes, Excess-3 code,	1	21-02-2025		TLM1	
21.	gray code, Hamming code,	1	25-02-2025		TLM2	
22.	Boolean Algebra, Basic Theorems and properties of	1	28-02-2025		TLM1	

	Boolean Algebra					
23.	Simple combinational circuits	1	28-02-2025		TLM1	
24.	Half and Full Adders,	1	04-03-2025		TLM2	
25.	Introduction to sequential circuits, Flip flops	1	05-03-2025		TLM1	
26.	Registers and counters	1	07-03-2025		TLM2	
27.	Revision	1	07-03-2025		TLM1	
No. of classes required to complete UNIT-III: 10				**No. of classes taken:**		

I Mid Examinations: 10-03-2025 to 15- 03-2025

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

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-IV, V & UNIT-VI)	A1=5
I-Descriptive Examination (Units-IV, V & UNIT-VI)	M1=15
I-Quiz Examination (Units-IV, V & UNIT-VI)	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-I , II & III)	M2=15
II-Quiz Examination (UNIT-I , II & III)	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	13-01-2025	08-03-2025	8W
I Mid Examinations	10-03-2025	15-03-2024	1W
II Phase of Instructions	17-03-2025	17-05-2025	9W
II Mid Examinations	02-06-2025	07-06-2025	1W
Preparation and Practicals	09-06-2025	14-06-2025	1W
Semester End Examinations	16-06-2025	28-06-2025	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	**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: 11-01-2025

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Dr. P. Venkat Rao	Dr. P. Rakesh Kumar	Dr. T. Satyanarayana	Dr. G. Srinivasulu

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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:** I B. Tech., II-Sem., AI&ML- B
ACADEMIC YEAR	**:** 2024-25
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.R.Kavitha
PRE-REQUISITES	**:** Basics of Vectors**,** Differentiation, Integration

COURSE EDUCATIONAL OBJECTIVES (CEOs):

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

COURSE OUTCOMES (COs)

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

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

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

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

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

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

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

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

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

BOS APPROVED TEXT BOOKS:

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

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

BOS APPROVED REFERENCE BOOKS:

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

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

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

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

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

Part-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to the course	1	20-01-2025		TLM2			
2.	Course Outcomes, Program Outcomes	1	21-01-2025		TLM2			

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
3.	Introduction to UNIT I	1	22-01-2025		TLM1	CO1	T1,T2	
4.	Linear Differential equation	1	24-01-2025		TLM1	CO1	T1,T2	
5.	Bernoulli's DE	1	24-01-2025		TLM1	CO1	T1,T2	
6.	Exact DE	1	27-01-2025		TLM1	CO1	T1,T2	
7.	Exact DE	1	28-01-2025		TLM1	CO1	T1,T2	
8.	Tutorial-1	1	29-01-2025		TLM3	CO1	T1,T2	
9.	Non-exact DE Type I	1	31-01-2025		TLM1	CO1	T1,T2	
10.	Non-exact DE Type II	1	31-01-2025		TLM1	CO1	T1,T2	
11.	Non-exact DE Type III	1	03-02-2025		TLM1	CO1	T1,T2	
12.	Non-exact DE Type IV	1	04-02-2025		TLM1	CO1	T1,T2	
13.	Tutorial-2	1	05-02-2025		TLM3	CO1	T1,T2	
14.	Newton's Law of cooling	1	07-02-2025		TLM1	CO1	T1,T2	
15.	Newton's Law of cooling	1	07-02-2025		TLM1	CO1	T1,T2	
16.	Law of natural growth and decay	1	10-02-2025		TLM1	CO1	T1,T2	
17.	Electrical circuits	1	11-02-2025		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-I		15			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	12-02-2025		TLM1	CO1	T1,T2	
19.	Solving a homogeneous DE	1	14-02-2025		TLM1	CO1	T1,T2	
20.	Finding Particular Integral, P.I for e^{ax+b}	1	14-02-2025		TLM1	CO1	T1,T2	
21.	P.I for Cos bx, or sin bx	1	17-02-2025		TLM1	CO1	T1,T2	
22.	P.I for polynomial function	1	18-02-2025		TLM1	CO1	T1,T2	
23.	P.I for $e^{ax+b}v(x)$	1	19-02-2025		TLM1	CO1	T1,T2	
24.	Tutorial-3	1	21-02-2025		TLM3	CO1	T1,T2	

25.	P.I for $x^k v(x)$	1	21-02-2025		TLM1	CO1	T1,T2	
26.	Method of Variation of parameters	1	24-02-2025		TLM1	CO1	T1,T2	
27.	Simultaneous linear equations	1	25-02-2025		TLM1	CO1	T1,T2	
28.	Simultaneous linear equations	1	28-02-2025		TLM1	CO1	T1,T2	
29.	L-C-R circuits	1	28-02-2025		TLM1	CO1	T1,T2	
30.	Simple Harmonic motion	1	03-03-2025		TLM1	CO1	T1,T2	
31.	Problems on SHM	1	04-03-2025		TLM1	CO1	T1,T2	
32.	Tutorial-4	1	05-03-2025		TLM3	CO1	T1,T2	
33.	Revision on Unit-1	1	07-03-2025		TLM1	CO1	T1,T2	
34.	Revision on Unit-1	1	07-03-2025		TLM1	CO1	T1,T2	
No. of classes required to complete UNIT-II		17			No. of classes taken:			

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

UNIT-III: Partial Differential Equations

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
35.	Introduction to Unit III	1	17-03-2025		TLM1	CO2	T1,T2	
36.	Formation of PDE by elimination of arbitrary constants	1	18-03-2025		TLM1	CO2	T1,T2	
37.	Formation of PDE by elimination of arbitrary functions	1	19-03-2025		TLM1	CO2	T1,T2	
38.	Formation of PDE by elimination of arbitrary functions	1	21-03-2025		TLM1	CO2	T1,T2	
39.	Solving of PDE	1	21-03-2025		TLM1	CO2	T1,T2	
40.	Lagrange's Method	1	24-03-2025		TLM1	CO2	T1,T2	
41.	Lagrange's Method	1	25-03-2025		TLM1	CO2	T1,T2	
42.	Tutorial-6	1	26-03-2025		TLM3	CO2	T1,T2	
43.	Homogeneous Linear PDE with constant coefficients	1	28-03-2025		TLM1	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
44.	Introduction to UNIT IV	1	28-03-2025		TLM1	CO3	T1,T2	
45.	Vector Differentiation	1	01-04-2025		TLM1	CO3	T1,T2	
46.	Tutorial-7	1	02-04-2025		TLM3	CO3	T1,T2	

47.	Directional Derivative	1	04-04-2025		TLM1	CO3	T1,T2	
48.	Problems on Directional Derivative	1	04-04-2025		TLM1	CO3	T1,T2	
49.	Divergence	1	07-04-2025		TLM1	CO3	T1,T2	
50.	Tutorial-8	1	08-04-2025		TLM3	CO3	T1,T2	
51.	Curl	1	09-04-2025		TLM1	CO3	T1,T2	
52.	Solenoidal fields, Irrotational fields, potential surfaces	1	11-04-2025		TLM1	CO3	T1,T2	
53.	Solenoidal fields, Irrotational fields, potential surfaces	1	11-04-2025		TLM1	CO3	T1,T2	
54.	Tutorial-9	1	15-04-2025		TLM3	CO3	T1,T2	
55.	Vector Identities	1	16-04-2025		TLM1	CO3	T1,T2	
56.	Problems on Identities	1	21-04-2025		TLM3	CO3	T1,T2	
No. of classes required to complete UNIT-IV		13			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
56	Introduction to Unit-V	1	22-04-2025		TLM1	CO4	T1,T2	
57.	Line Integral	1	23-04-2025		TLM1	CO4	T1,T2	
58.	Tutorial-10	1	25-04-2025		TLM3	CO4	T1,T2	
59.	Work done	1	25-04-2025		TLM1	CO4	T1,T2	
60.	Circulation	1	28-04-2025		TLM1	CO4	T1,T2	
61.	Surface Integral	1	29-04-2025		TLM1	CO4	T1,T2	
62.	Surface Integral	1	30-04-2025		TLM1	CO4	T1,T2	
63.	Volume Integral	1	02-05-2025		TLM1	CO4	T1,T2	
64.	Tutorial-11	1	02-05-2025		TLM3	CO4	T1,T2	
65.	Green's Theorem	1	05-05-2025		TLM1	CO4	T1,T2	
66.	Problems on GT	1	06-05-2025		TLM1	CO4	T1,T2	
67.	Stoke's Thoerem	1	07-05-2025		TLM1	CO4	T1,T2	
68.	Tutorial-12	1	09-05-2025		TLM3	CO4	T1,T2	
69.	Divergence Theorem	1	09-05-2025		TLM1	CO4	T1,T2	
70.	Problems on Divergence theorem	1	12-05-2025		TLM1	CO4	T1,T2	
71.	Revision on Unit-3	1	13-05-2025		TLM1	CO4	T1,T2	
72.	Revision on Unit-4	1	14-05-2025		TLM1	CO4	T1,T2	
73.	Revision on Unit-5	1	16-05-2025		TLM1	CO4	T1,T2	
No. of classes required to complete UNIT-V		18			No. of classes taken:			

Content beyond the Syllabus

S. No.	Topics to be	No. of	Tentative	Actual	Teaching	Learning	Text	HOD

	covered	Classes Required	Date of Completion	Date of Completion	Learning Methods	Outcome COs	Book followed	Sign Weekly
74.	Non-homogeneous Linear PDE with constant coefficients	1	16-05-2025		TLM2	CO2	T1,T2	
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (02-06-2025 TO 07-06-2025)								

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

PART-CEVALUATION PROCESS (R23 Regulation):

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

PART-D PROGRAMME OUTCOMES (POs):

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

Dr. M.Srinivasa Reddy	**Dr.K.R.Kavitha**	**Dr. A. RAMI REDDY**	**Dr. A. RAMI REDDY**
Course Instructor	Course Coordinator	Module Coordinator	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

Name of Course Instructor : Dr. P. Venkat Rao, Dr. P. Rakesh Kumar, Mr. P. James Vijay, Ms. B. Lakshmi Thirupathamma

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

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

Program/Sem : B.Tech. AI&ML- II Sem-Sec B **A.Y.** : 2024-25

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): B.Tech. AI&ML- II Sem-Sec B

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	23-01-2025		TLM4	
2.	Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.	3	30-01-2025		TLM4	
3.	Plot V – I characteristics of Zener Diode and its application as voltage Regulator	3	06-02-2025		TLM4	
4.	Implementation of half wave and full wave rectifiers	3	13-02-2025		TLM4	
5.	Plot Input & Output characteristics of BJT in CB configuration	3	20-02-2025		TLM4	
6.	Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs/ Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs	3	27-02-2025		TLM4	
7.	Internal Lab Examination (**Electronics**)	3	06-03-2025		TLM4	
No. of classes required: 21				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
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: 20-01-2025

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Dr. P. Venkat Rao	Mrs. B. Rajeswari	Dr. T. Satyanarayana	Dr. G. Srinivasulu

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (AI & ML)

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. CH. John Wesily
Course Name & Code : DATA STRUCTURES & 23CS02
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/CSE/II /B **A.Y.:** 2024-25

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	20-01-2025		TLM1	
2.	Definition and Importance of Linear Data Structures	1	20-01-2025		TLM1	
3.	Abstract Data Types and Implementation	1	21-01-2025		TLM1	
4.	Overview of time and space complexity	1	24-01-2025		TLM1	
5.	Analysis of Liner Data structures	2	27-01-2025 27-01-2025		TLM1	
6.	Revise Arrays	1	28-01-2025		TLM1	
7.	Searching Techniques: Linear Search	1	31-02-2025		TLM1	
8.	Binary Search & Analysis	2	03-02-2025 03-02-2025		TLM1	
9.	Bubble Sort & Analysis	1	04-02-2025		TLM1	
10.	Insertion Sort & Analysis	2	07-02-2025 10-02-2025		TLM1	
11.	Selection Sort & Analysis	2	10-02-2025 11-02-2025		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	14-02-2025		TLM1	
13.	Linked List Representation	1	17-02-2025		TLM1	
14.	Sing Linked List : Operations	3	17-02-2025 18-02-2025 21-02-2025		TLM1	
15.	Double Linked List : Operations	2	24-02-2025 24-02-2025		TLM1	
16.	Circular Single Linked List	1	25-02-2025		TLM1	
17.	Circular Double Linked List	2	28-02-2025 03-03-2025		TLM1	
18.	Comparing Arrays and Linked List	1	03-03-2025		TLM1	
19.	Applications of Linked Lists: Polynomial Representation	1	04-03-2025		TLM1	
20.	Polynomial Addition	1	07-03-2025		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	17-03-2025		TLM1	

22.	Operations of Stacks	1	17-03-2025		TLM1	
23.	Implementation of stacks using arrays	1	18-03-2025		TLM1	
24.	Stacks using Linked List	1	21-03-2025		TLM1	
25.	Expressions: Expression evaluation	2	24-03-2025 24-03-2025		TLM1	
26.	Infix to Postfix Conversion	2	25-03-2025 28-03-2025		TLM1	
27.	Checking Balanced Parenthesis	2	01-04-2025 04-04-2025		TLM1	
28.	Reversing a List	1	07-04-2025		TLM1	
29.	Backtracking	1	07-04-2025		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	08-04-2025		TLM1	
31.	Implementing queues using arrays	1	11-04-2025		TLM1	
32.	Implementing queues using Linked List	1	15-04-2025		TLM1	
33.	Applications of Queue : Scheduling	1	21-04-2025		TLM1	
34.	Breadth First Search	1	21-04-2025		TLM1	
35.	Circular Queue	2	22-04-2025 25-04-2025		TLM1	
36.	Double ended queue	1	28-04-2025		TLM1	
37.	Applications of Deque	1	28-04-2025		TLM1	
No. of classes required to complete UNIT-IV: 9				**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	29-04-2025		TLM1	
39.	Representation of Trees	1	02-05-2025		TLM1	
40.	Tree Traversals	1	05-05-2025		TLM1	
41.	Binary Search Trees-Operations	1	05-05-2025		TLM1	
42.	Hashing Introduction and Hash Functions	1	06-05-2025		TLM1	
43.	Collison Resolution Techniques: Separate Chaining	1	09-05-2025		TLM1	
44.	Open Addressing: Linear Probing	1	12-05-2025		TLM1	
45.	Quadratic Probing, Double Hashing	1	12-05-2025		TLM1	
46.	Rehashing	1	13-05-2025		TLM1	
47.	Applications of Hashing	1	16-05-2025		TLM1	
No. of classes required to complete UNIT-V: 10				**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	07-04-2024					
2.	Towers of Hanoi	1	21-04-2024					
3.	Extendable Hashing	1	06-05-2024					
No. of classes		3			No. of classes taken:			
II MID EXAMINATIONS (02-06-2024 TO 07-06-2024)								

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.
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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	Mr. CH. John Wesily	Dr Y Vijaya Bhaskar Reddy	Dr Y Vijaya Bhaskar Reddy	**Dr.S.Jayaprada**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC with 'A' Grade
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
hodcsm@lbrce.ac.in, csmoffice@lbrce.ac.in, Phone: 08659-222 933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (AI & ML)

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. CH John Wesily
Course Name & Code : DATA STRUCTURES LAB & 23CS52
L-T-P Structure : **0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/CSE/II/B **A.Y.:** 2024-25

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	23-01-2025		
2.	Searching and Sorting Techniques	3	30-01-2025		
3.	Single Linked List	3	06-02-2025		
4.	Double Linked List	3	13-02-2025 20-02-2025		
5.	Circular Linked List	3	27-02-2025		
6.	Polynomial Representation & Polynomial Addition	3	07-03-2025		
7.	Linked List Applications	3	21-03-2025		
8.	Stack Implementation	3	28-03-2025		
9.	Stack Applications	3	03-04-2025		
10.	Queue Implementation & Circular Queue	3	10-04-2025 17-04-2025		
11.	Double Ended Queue	3	24-04-2025		
12.	Binary Search Tree	3	01-05-2025		
13.	Hashing	3	8-05-2025		
14.	Internal Exam	3	15-05-2025		

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	Mr. CH. John Wesily	Dr Y Vijaya Bhaskar Reddy	Dr Y Vijaya Bhaskar Reddy	**Dr.S.Jayaprada**
Signature				

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Phone: 08659-222933, Fax: 08659-222931
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)

COURSE HANDOUT
PART-A

Name of Course Instructor(s): **Mr. Jonnala Subba Reddy (T668),**
Mr. S. Srinivasa Reddy (T808), Dr. S. Rami Reddy (T589)

Course Name & Code	**:** Engineering Graphics – 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.**	**:** 2024-25
PREREQUISITE	**:** Engineering Physics, 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, Engineering Drawing, 51th Revised and Enlarged Edition, Charotar publishers,2012

REFERENCE BOOKS:

R1 Narayana K L, Kannaiah P, Textbook on Engineering Drawing, 2nd Edition, SciTechpublishers.
R2 R.K.Dhawan, Engineering Drawing, S.Chand Company LTD.
R3 Venugopal, Engineering Drawing and Graphics, New Age publishers
R4 Dhananjay A. Jolhe, Engineering Drawing, Tata McGraw Hill Publishers
R5 N.S.Parthasarathy, Vela Murali, Engineering Drawing, Oxford Higher Education

COURSE DELIVERY PLAN (LESSON PLAN) **PART-B**

UNIT - I: INTRODUCTION, GEOMETRICAL CONSTRUCTIONS, SCALES, CONICS, CYCLOIDS, INVOLUTES, ORTHOGRAPHIC PROJECTIONS OF POINTS

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, POs and PEOs **UNIT I: INTRODUCTION:** Introduction to Engineering Drawing, Principles of Engineering Graphics,and their Significance	3	20-01-2025		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
02	Drawing Instruments and their use-Conventions in Drawing, Lines, Lettering, and Dimensioning – BIS Conventions, Practice	2	22-01-2025		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	3	27-01-2025		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
04	Engineering **Curves**: Conic Sections, Construction of Ellipse, Parabola, and Hyperbola by general method only	2	29-01-2025		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
05	Construction of Cycloids, Involutes, Normal and tangent to Curves, Practice	3	03-02-2025		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
06	**Orthographic Projections**: Reference plane, importance of reference lines or Plane, Practice	2	05-02-2025		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
07	Projections of a point situated in any one of the four quadrants, Practice	3	10-02-2025		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
No. of classes required to complete UNIT - I: 18 (Lecture:06 Practice: 12)			**No. of classes taken (including Practice):**					

UNIT-II: PROJECTIONS OF STRAIGHT 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
08	**Projections of straight lines:** Projections of straight lines parallel to both reference planes, perpendicular to one reference plane, and parallel to other reference planes, Practice	2	12-02-2025		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
09	Projections of lines inclined to one reference plane and parallel to the other reference plane, Practice	3	17-02-2025		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
10	Projections of Straight Line Inclined to both the reference planes, Practice	2	19-02-2025		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
11	**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	24-02-2025		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
12	Projections of planes inclined to both the reference planes, Practice	2	26-02-2025		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
13	Practice	3	03-03-2025		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
14	Practice	2	05-03-2025		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
-	**I Mid Examinations: From 10-03-2025 to 15-03-2025 (Covered CO 1 & CO 2)**							
No. of classes required to complete UNIT - II: 17 (Lecture:6 Practice: 11)			**No. of classes taken (including Practice):**					

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 simple positions: Axis perpendicular to HP, Practice	3	17-03-2025		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
16	Projections of solids in simple positions: Axis perpendicular to vertical plane and Axis parallel to both the reference planes	2	19-03-2025		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	3	24-03-2025		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
18	Numericals	2	26-03-2025		TLM 1, 2	**CO 3**	**T1, R1 to R5**	
19	Practice	3	31-03-2025		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
20	Practice	2	02-04-2025		TLM 1, 2, 3	**CO 3**	**T1, R1 to R5**	
No. of classes required to complete UNIT - III: 15 (Lecture:06 Practice: 09)			**No. of classes taken (including Practice):**					

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	3	07-04-2025		TLM 1, 2	**CO 4**	**T1, R1 to R5**	
22	Sectional views and True shape of section, Practice	2	09-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
23	Sections of solids in simple position only, Numericals	3	14-04-2025		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	2	16-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	

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
25	Radial Line Development, Numericals	3	21-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
26	Practice	2	23-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
27	Practice	3	28-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
28	Practice	2	30-04-2025		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
No. of classes required to complete UNIT - IV: 20 (Lecture:08 Practice: 12)			**No. of classes taken (including Practice):**					

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
29	Introduction to Isometric Views, Conversion of Views: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views	3	07-05-2025		TLM 1, 2	**CO 5**	**T1, R1 to R5**	
30	Practice	2	07-05-2025		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	3	12-05-2025		TLM 1, 2	**CO 5**	**T1, R1 to R5**	
32	Practice	2	14-05-2025		TLM 1, 2, 3	**CO 5**	**T1, R1 to R5**	
No. of classes required to complete UNIT - V: 10 (Lecture:04 Practice: 06)			**No. of classes taken (including Practice):**					
II Mid Examinations: From 02-06-2025 to 07-06-2025 (Covered CO 3, CO 4 & CO 5)								

Teaching Learning Methods:

TLM1: Chalk and Talk	**TLM2:** PPT	**TLM3:** Tutorial	**TLM4:** Demonstration (Lab/Field Visit)		
TLM5: ICT (NPTEL/SwayamPrabha/MOOCS)		**TLM6:** Group Discussion/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 CALENDER - B.Tech - II Semester (R23):

Commencement of Class work		**13-01-2025**	
Description	**From**	**To**	**Weeks**
I Phase of Instructions	13-01-2025	08-03-2025	8 Weeks
I Mid Examinations	10-03-2025	15-03-2025	1 Week
II Phase of Instructions	17-03-2025	17-05-2025	9 Weeks
Summer Vacation	19-05-2025	31-05-2025	2 Weeks
II Mid Examinations	02-06-2025	07-06-2025	1 Week
Preparation and Practicals	09-06-2025	14-06-2025	1 Week
Semester End Examinations	16-06-2025	28-06-2025	2 Weeks
Commencement of Next (III) Semester Class Work		**30-06-2025**	

Class Time Table - B.Tech – II 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				**LUNCH BREAK**	**Engineering Graphics**		
Tuesday							
Wednesday		**Engineering Graphics**					
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: 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 (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: Design and develop sophisticated software systems, leveraging expertise in data structures, algorithm analysis, web design, and proficiency in machine learning techniques.

PSO2: Possess the strong data analysis and interpretation skills, enabling them to extract meaningful insights and patterns from large datasets using AI & ML methodologies.

Signature				
Name of the Faculty	Mr. J. Subba Reddy	Mr. J. Subba Reddy	Mr. J. Subba Reddy	Dr. S. Jayaprada
Designation / Title	Associate Professor / Course Instructor	Associate Professor / Course Coordinator	Associate Professor/ Module Coordinator	Professor / Head of the Department

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(An Autonomous Institution since 2010)
Approved by AICTE, New Delhi and Permanently Affiliated to JNTUK, Kakinada
L.B. Reddy Nagar, Mylavaram, NTR District, Andhra Pradesh - 521230
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (AI& ML)

COURSE HANDOUT

PROGRAM : B.Tech. II-Sem, CSE(AI&ML)-B SECTION

ACADEMIC YEAR : 2024-25

COURSE NAME & CODE : Engineering Workshop, 20ME51

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

COURSE CREDITS : 1.5

COURSE INSTRUCTOR : Dr. A. Dhanunjay Kumar, Sr. Assistant Professor,
Dr. P.Vijay Kumar, 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	25-01-2025		TLM8	-	
2.	Experiment-1	3	01-02-2025		TLM8	R1	
3.	Experiment-2	3	08-02-2025		TLM8	R1	
4.	Experiment-3	3	15-02-2025		TLM8	R1	
5.	Experiment-4	3	22-02-2025		TLM8	R1	
6.	Experiment-5	3	01-03-2025		TLM8	R1	
7.	Experiment-6	3	08-03-2025		TLM8	R1	
I-Mid Examinations (10-03-2025 to 15-03-2025)							
8.	Experiment-7	3	22-03-2025		TLM8	R1	
9.	Experiment-8	3	29-03-2025		TLM8	R1	
10.	Experiment-9	3	12-04-2025		TLM8	R1	
11.	Experiment-10	3	19-04-2025		TLM8	R1	
12.	Repetition lab	3	26-04-2025		TLM8	--	
13.	Repetition lab	3	03-05-2025		TLM8	--	
14.	Repetition lab	3	10-05-2025		TLM8	--	
15.	Lab Internal	3	17-05-2025		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	13-01-2025	08-03-2025	8W
I Mid Examinations	10-03-2025	15-03-2025	1W
II Phase of Instructions	17-03-2025	17-05-2025	9W
II Mid Examinations	02-06-2025	07-06-2025	1W
Preparation and Practical's	09-06-2025	14-06-2025	1W
Semester End Examinations	16-06-2025	28-06-2025	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: B-SEC

Batch No.	Reg. No. of Students	Number of Students	Batch No.	Reg. No. of Students	Number of Students
B11	24761A4267 TO 24761A4274	8	B21	24761A4299 TO 24761A42A6	8
B12	24761A4275 TO 24761A4282	8	B22	24761A42A7 TO 24761A42B4	8
B13	24761A4283 TO 24761A4290	8	B23	24761A42B5 TO 24761A2C2	8
B14	24761A4291 TO 24761A4298	8	B24	24761A42C3 TO 24761A42D1	9

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**
Dr. A. Dhanunjay Kumar Dr. P.Vijay Kumar	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 (Under Tier - I),
ISO 21001 : 2018, 50001 : 2018, 14001: 2015 Certified Institution
Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
Phone: 08659-222933, Fax: 08659-222931

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	:	B. Tech., II-Sem., AIML-B
ACADEMIC YEAR	:	2024-2025
COURSE NAME & CODE	:	ENGINEERING PHYSICS LAB & 23FE53
L-T-P STRUCTURE	:	0-0-2
COURSE CREDITS	:	1
COURSE INSTRUCTOR	:	**Dr. S. YUSUF**
COURSE COORDINATOR	:	**Dr. S. YUSUF**

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- AIML-B

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	25-01-2025		**TLM4**	1,2,3,4	T1	
2.	Demonstration	3	01-02-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
3.	Experiment 1	3	04-02-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
4.	Experiment 2	3	08-02-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
5.	Experiment 3	3	15-02-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
6.	Experiment 4	3	22-02-2025		**TLM4**	CO1, CO2, CO3, CO4	T1	
7.	Experiment 5	3	08-03-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
8.	Demonstration	3	15-03-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
9.	Experiment 6	3	22-03-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
10.	Experiment 7	3	29-03-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
11.	Experiment 8	3	05-04-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
12.	Experiment 9	3	12-04-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	

13.	Experiment 10	3	19-04-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
14.	Revision	3	26-04-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
15.	**Internal Exam**	3	03-05-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
16.	**Internal Exam**	3	17-05-2025		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
No. of classes required to complete UNIT-I		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)

1.To Attain a solid foundation in Electronics & Communication Engineering fundamentals with an attitude to pursue continuing education.
2. To Function professionally in the rapidly changing world with advances in technology.
3. To Contribute to the needs of the society in solving technical problems using Electronics & Communication Engineering principles, tools and practices.
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. YUSUF / Dr. N.T. Sarma	Dr. S. YUSUF	Dr. S. YUSUF	Dr. A. RAMI REDDY