FRESHMANENGINEERINGDEPARTMENT

COURSEHANDOUT

PART-A

PROGRAM	**:I B.Tech.,II-Sem.,AIDS-A**
ACADEMICYEAR	**:2025-26**
COURSENAME &CODE	**: ENGINEERING PHYSICS**
L-T-PSTRUCTURE	**:4-0-0**
COURSECREDITS	**3**
COURSEINSTRUCTOR	**:Dr. K. Kumara Raja**
PRE-REQUISITE	**:Basic Knowledge of Physics**

Course Objectives:

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

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

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

COURSEARTICULATIONMATRIX(Correlation between COs, Pos & PSOs):

ENGINEERING PHYSICS												
COURSE DESIGNED BY	**FRESHMAN ENGINEERING DEPARTMENT**											
Course Outcomes PO's	**Programme Outcomes**											
	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)**												

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).

WEBRESOURCES

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

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

PART-B

COURSEDELIVERYPLAN(LESSONPLAN):

UNIT-I:INTERFERENCE,DIFFRACTION& POLARIZATION

Course Outcome :-CO1;TextBook:-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	2.2.26		**TLM-2**		
2.	Principle of superposition, Interference of light	1	4.2.26		**TLM-3**		
3.	Interference in thin films by reflection & applications	1	6.2.26		**TLM-2**		
4.	Colors in thin films, Newton's rings	1	6.2.26		**TLM-1**		
5.	Determination of wavelength and refractive index	1	9.2.26		**TLM-4**		
6.	Problems& Assignment/Quiz	1	11.2.26		**TLM-1**		
7.	Introduction, Fresnel and	1	13.2.26		**TLM-3**		

	Fraunhoffer diffractions						
8.	Fraunhoffer diffraction due to single slit	1	13.2.26		**TLM-2**		
9.	Double slit& N slits(Qualitative)	1	16.2.26		**TLM-4**		
10.	Diffraction Grating, Dispersive power & Resolving power of Grating-Qualitative	1	18.2.26		**TLM-4**		
11.	Problems& Assignment/Quiz	1	20.2.26		**TLM-3**		
12.	Introduction – Types of polarization	1	20.2.26		**TLM-2**		
13.	Polarization by reflection, refraction & double refraction	1	23.2.26		**TLM-2**		
14.	Nicol's prism	1	25.2.26		**TLM-5**		
15.	Half wave and Quarter wave plates	1	27.2.26		**TLM-2**		
16.	Problems& Assignment/Quiz	1	27.2.26		**TLM-3**		
No.of classes required to complete UNIT-I:16				No.of classes taken:			

UNIT-II:CRYSTALLOGRAPHY & X– RAY DIFFRACTION

Course Outcome :-CO2;TextBook:-T1,R2

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.	Space lattice; Basis, Unit cell & Lattice parameters	1	2.3.26		**TLM-3**		
2.	Bravais Lattices	1	4.3.26		**TLM-2**		
3.	Crystal Systems(3D)	1	6.3.26		**TLM-2**		
4.	Coordination number – Packing fraction of –SC, BCC	1	6.3.26		**TLM-1**		
5.	Coordination number – Packing fraction of FCC	1	9.3.26		**TLM-1**		
6.	Miller indices& Properties	1	11.3.26		**TLM-2**		
7.	Separation between successive (hkl) planes	1	13.3.26		**TLM-1**		

8.	Bragg's law;	1	13.3.26		**TLM-3**		
9.	X–ray Diffractometer	**1**	16.3.26		**TLM-2**		
10.	Crystal Structure determination by Laue's method	1	18.3.26		**TLM-2**		
11.	Crystal Structure determination by Powder method	1	20.3.26		**TLM-5**		
12.	Problems& Assignment/Quiz	1	20.3.26		**TLM-3**		
13.	MID-1 Examinations	1	23.3.26		----		
14.	MID-1 Examinations	1	25.3.26		----		
15.	MID-1 Examinations	1	27.3.26		----		
16.	MID-1 Examinations	1	27.3.26		----		
No.of classes required to complete UNIT-II: 16				No.of classes taken:			

UNIT-III :DIELECTRIC & MAGNETIC MATERIALS

Course Outcome :-CO3;TextBook:-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.	Dielectric polarization Dielectric polarizability, Susceptibility	1	30.3.26		**TLM-2**		
2.	Dielectric constant & Displacement Vector, Relation between the electric vectors	1	1.4.26		**TLM-3**		
3.	Types of polarizations-Electronic polarization	1	6.4.26		**TLM-1**		
4.	Types of polarizations- ionic & orientation polarizations (Qualitative)	1	8.4.26		**TLM-1**		
5.	Lorentz internal field	1	10.4.26		**TLM-2**		
6.	Claussius-Mosotti equation, Complex dielectric constant	1	10.4.26		**TLM-1**		
7.	Frequency dependence of polarization dielectric loss	1	13.4.26		**TLM-5**		

8.	Problems& Assignment/Quiz	1	15.4.26		**TLM-3**		
9.	Introduction Magnetic dipole moment, Magnetization Magnetic susceptibility & permeability	1	17.4.26		**TLM-4**		
10.	Atomic origin of magnetism	1	17.4.26		**TLM-1**		
11.	Classification of magnetic materials- Dia, para, Ferro, anti-ferro & Ferri magnetic materials	1	20.4.26		**TLM-2**		
12.	Domain concept for Ferromagnetism & Domain walls	1	22.4.26		**TLM-2**		
13.	Hysteresis	1	24.4.26		**TLM-5**		
14.	soft and hard magnetic materials	1	24.4.26		**TLM-1**		
15.	Problems& Assignment/Quiz	1	27.4.26		**TLM-3**		
No.of classes required to complete UNIT-III:15				No.of classes taken:			

UNIT-IV :QUANTUM MECHANICS&FREEELECTRONTHEORY

Course Outcome :-CO4;TextBook:-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.	Dual nature of matter,De-Broglie's Hypothesis	1	29.4.26		**TLM-2**		
2.	Heisenberg's Uncertainty Principle	1	1.5.26		**TLM-2**		
3.	Significance & properties of wave function	1	1.5.26		**TLM-2**		
4.	Schrodinger's time independent and dependent wave equations	1	4.5.26		**TLM-1**		
5.	Particle in a one – dimensional infinite potential well	1	6.5.26		**TLM-1**		
6.	Problems& Assignment/Quiz	1	8.5.26		**TLM-3**		
7.	Classical free electron theory-merits and demerits, Quantum free electron theory	1	8.5.26		**TLM-2**		
8.	Electrical conductivity based	1	11.5.26		**TLM-1**		

	on quantum free electron theory						
9.	Fermi -Dirac distribution and temperature dependence	1	13.5.26		**TLM-5**		
10.	Density of states, Fermi energy	1	15.5.26		**TLM-1**		
11.	Problems& Assignment/Quiz	1	15.5.26		**TLM-3**		
No.of classes required to complete UNIT-IV:11				No.of classes taken:			

UNIT-V:SEMICONDUCTORPHYSICS

Course Outcome :-CO5;TextBook:-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.	Formation of energy bands, Classification of crystalline solids	1	1.6.26		**TLM-6**		
2.	Intrinsic semiconductors, Density of charge carriers	1	3.6.26		**TLM-1**		
3.	Electrical conductivity, Fermi level	1	5.6.26		**TLM-2**		
4.	Extrinsic semiconductors, Density of charge carriers	1	5.6.26		**TLM-1**		
5.	Dependence of Fermi energy on carrier concentration &temperature	1	8.6.26		**TLM-2**		
6.	Drift and Diffusion Currents, Einstein's equation	1	10.6.26		**TLM-1**		
7.	Hall Effect & its applications	1	12.6.26		**TLM-4**		
8.	Problems& Assignment/Quiz	1	12.6.26		**TLM-3**		
9.	MID-2 Examinations	1	15.6.26		----		
10.	MID-2 Examinations	1	17.6.26		----		
11.	MID-2 Examinations	1	19.6.26		----		
12.	MID-2 Examinations	1	19..6.26		----		
No.of classes required to complete UNIT-V:12				No.of classes taken:			

PART-C

EVALUATION PROCESS(R-23Regulation)

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

PART-D

PROGRAMMEOUTCOMES(POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineeringfundamentals,andanengineeringspecializationtothesolutionofcomplex engineeringproblems.
PO 2	**Problemanalysis**:Identify,formulate,reviewresearchliterature,andanalyze complexengineeringproblemsreachingsubstantiatedconclusionsusingfirstprinciplesofmathematics,naturalsciences,and engineeringsciences.
PO 3	**Design/developmentofsolutions**:Designsolutionsforcomplexengineeringproblems and design system components or processes that meet the specified needswithappropriateconsiderationforthepublichealthandsafety,andthecultural, societal,andenvironmentalconsiderations.
PO 4	**Conductinvestigationsofcomplexproblems**:Useresearch-basedknowledgeand researchmethodsincludingdesignofexperiments,analysisandinterpretationofdata,andsynthesisoftheinformationtoprovidevalidconclusions.
PO 5	**Moderntoolusage**:Create,select,andapplyappropriatetechniques,resources,and modernengineeringandITtoolsincludingpredictionandmodelingtocomplexengineeringactivitieswithanunderstandingofthe limitations
PO 6	**The engineer and society**:Apply reasoninginformedby the contextual knowledgetoassesssocietal,health,safety,legalandculturalissuesandtheconsequent responsibilitiesrelevanttotheprofessionalengineeringpractice
PO 7	**Environmentandsustainability**:Understandtheimpactoftheprofessionalengineeringsolutionsinsocietalandenvironmentalcontexts,anddemonstratethe knowledgeof,andneed forsustainabledevelopment.

PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilitiesandnormsoftheengineeringpractice.
PO 9	**Individualandteamwork**:Functioneffectivelyasanindividual,andasamember orleaderindiverseteams,andinmultidisciplinarysettings.
PO 10	**Communication**: Communicate effectively on complex engineering activities withtheengineeringcommunityandwithsocietyatlarge,suchas,beingabletocomprehenda ndwriteeffectivereportsanddesigndocumentation,makeeffective presentations,andgiveandreceiveclearinstructions.
PO 11	**Projectmanagementandfinance**: Demonstrate knowledge andunderstandingofthe engineering and management principles and apply these to one's own work, as amemberandleaderinateam,tomanageprojectsandinmultidisciplinary environments.
PO 12	**Life-longlearning**:Recognizetheneedforandhavethepreparationandabilityto engageinindependentandlife-longlearninginthebroadestcontextoftechnologicalchange.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr. K. Kumara Raja	**Dr.S.YUSUF**	**Dr.S.YUSUF**	**Dr. T. Satyanarayana**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT
Part-A

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

COURSE EDUCATIONAL OBJECTIVES (CEOs):
- To enlighten the learners in the concept of differential equations and 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	02/02/2026		TLM2			
2.	Course Outcomes, Program Outcomes	1	03/02/2026		TLM2			

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
3.	Introduction to UNIT I	1	04/02/2026		TLM1	CO1	T1, T2	
4.	Linear Differential equation	1	05/02/2026		TLM1	CO1	T1, T2	
5.	Bernoulli's DE	1	07/02/2026		TLM1	CO1	T1, T2	
6.	Bernoulli's DE	1	09/02/2026		TLM1	CO1	T1, T2	
7.	Exact DE	1	10/02/2026		TLM1	CO1	T1, T2	
8.	TUTORIAL - 1	1	11/02/2026		TLM1	CO1	T1, T2	
9.	Non-exact DE Type I	1	12/02/2026		TLM3	CO1	T1, T2	
10.	Non-exact DE Type II	1	14/02/2026		TLM1	CO1	T1, T2	
11.	Non-exact DE Type III	1	16/02/2026		TLM1	CO1	T1, T2	
12.	Non-exact DE Type IV	1	17/02/2026		TLM1	CO1	T1, T2	
13.	TUTORIAL - 2	1	18/02/2026		TLM1	CO1	T1, T2	
14.	Newton's Law of cooling	1	19/02/2026		TLM1	CO1	T1, T2	
15.	Law of natural growth and decay	1	21/02/2026		TLM1	CO1	T1, T2	
16.	Electrical circuits	1	23/02/2026		TLM3	CO1	T1, T2	
No. of classes required to complete UNIT-I		14			No. of classes taken:			

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Introduction to UNIT II	1	24/02/2026		TLM1	CO1	T1, T2	
18.	TUTORIAL - 3	1	25/02/2026		TLM1	CO1	T1, T2	
19.	Solving a homogeneous DE	1	26/02/2026		TLM1	CO1	T1, T2	
20.	Finding Particular Integral, P.I for e^{ax+b}	1	28/02/2026		TLM1	CO1	T1, T2	
21.	TUTORIAL - 4	1	02/03/2026		TLM1	CO1	T1, T2	
22.	P.I for Cos bx, or sin bx	1	04/03/2026		TLM1	CO1	T1, T2	
23.	P.I for polynomial function	1	05/03/2026		TLM1	CO1	T1, T2	
24.	P.I for $e^{ax+b}v(x)$	1	07/03/2026		TLM3	CO1	T1, T2	
25.	P.I for $x^k v(x)$	1	09/03/2026		TLM1	CO1	T1, T2	
26.	Method of Variation of parameters	1	10/03/2026		TLM1	CO1	T1, T2	
27.	TUTORIAL - 5	1	11/03/2026		TLM1	CO1	T1, T2	

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

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

UNIT-III: Partial Differential Equations

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
32.	Introduction to Unit III	1	18/03/2026		TLM1	CO2	T1, T2	
33.	Formation of PDE by elimination of arbitrary constants	1	20/03/2026		TLM1	CO2	T1, T2	
34.	Formation of PDE by elimination of arbitrary functions	1	30/03/2026		TLM1	CO2	T1, T2	
35.	Formation of PDE by elimination of arbitrary functions	1	31/03/2026		TLM1	CO2	T1, T2	
36.	TUTORIAL - 6	1	01/04/2026		TLM1	CO2	T1, T2	
37.	Solving of PDE	1	02/04/2026		TLM1	CO2	T1, T2	
38.	Lagrange's Method	1	04/04/2026		TLM1	CO2	T1, T2	
39.	Homogeneous Linear PDE with constant coefficients	1	06/04/2026		TLM3	CO2	T1, T2	
40.	Homogeneous Linear PDE with constant coefficients	1	07/04/2026		TLM1	CO2	T1, T2	
41.	TUTORIAL - 7	1	08/04/2026		TLM1	CO2	T1, T2	
42.	Homogeneous Linear PDE with constant coefficients	1	09/04/2026		TLM3	CO2	T1, T2	
No. of classes required to complete UNIT-III		11			No. of classes taken:			

UNIT-IV: Vector Differentiation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
43.	Introduction to UNIT IV	1	11/04/2026		TLM1	CO3	T1, T2	
44.	Vector Differentiation	1	13/04/2026		TLM1	CO3	T1, T2	
45.	TUTORIAL - 8	1	15/04/2026		TLM1	CO3	T1, T2	
46.	Gradient	1	16/04/2026		TLM1	CO3	T1, T2	
47.	Directional Derivative	1	18/04/2026		TLM1	CO3	T1, T2	
48.	Divergence	1	20/04/2026		TLM3	CO3	T1, T2	
49.	Curl	1	21/04/2026		TLM1	CO3	T1, T2	
50.	TUTORIAL - 9	1	22/04/2026		TLM1	CO3	T1, T2	
51.	Solenoidal fields, Irrotational fields, potential surfaces	1	23/04/2026		TLM1	CO3	T1, T2	

52.	Solenoidal fields, Irrotational fields, potential surfaces	1	25/04/2026		TLM1	CO3	T1, T2	
53.	Laplacian, second order operators	1	27/04/2026		TLM3	CO3	T1, T2	
54.	Vector Identities	1	28/04/2026		TLM1	CO3	T1, T2	
55.	TUTORIAL - 10	1	29/04/2026		TLM1	CO3	T1, T2	
56.	Vector Identities	1	30/04/2026		TLM3	CO3	T1, T2	
No. of classes required to complete UNIT-IV		14			No. of classes taken:			

UNIT-V: Vector Integration

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
58.	Introduction to Unit-V	1	02/05/2026		TLM1	CO4	T1, T2	
59.	Line Integral	1	04/05/2026		TLM1	CO4	T1, T2	
60.	Circulation	1	05/05/2026		TLM1	CO4	T1, T2	
61.	TUTORIAL - 11	1	06/05/2026		TLM1	CO4	T1, T2	
62.	Work done	1	07/05/2026		TLM1	CO4	T1, T2	
63.	Surface Integral, Flux	1	09/05/2026		TLM3	CO4	T1, T2	
64.	Volume Integral	1	11/05/2026		TLM1	CO4	T1, T2	
65.	Green's Theorem	1	12/05/2026		TLM1	CO4	T1, T2	
66.	TUTORIAL - 12	1	13/05/2026		TLM1	CO4	T1, T2	
67.	Green's Theorem	1	14/05/2026		TLM1	CO4	T1, T2	
68.	Stoke's Thoerem	1	16/05/2026		TLM3	CO4	T1, T2	
69.	Stoke's Thoerem	1	01/06/2026		TLM1	CO4	T1, T2	
70.	Divergence Theorem	1	02/06/2026		TLM1	CO4	T1, T2	
71.	TUTORIAL - 13	1	03/06/2026		TLM1	CO4	T1, T2	
72.	Divergence Theorem	1	04/06/2026		TLM1	CO4	T1, T2	
73.	Divergence Theorem	1	06/06/2026		TLM1	CO4	T1, T2	
74.	Revision	1	08/06/2026		TLM1	CO4	T1, T2	
75.	Revision	1	09/06/2026		TLM1	CO4	T1, T2	
76.	TUTORIAL - 14	1	10/06/2026		TLM1	CO4	T1, T2	
77.	Revision	1	11/06/2026		TLM1	CO4	T1, T2	
78.	Revision	1	13/06/2026		TLM1	CO4	T1, T2	
No. of classes required to complete UNIT-V		14			No. of classes taken:			

Content beyond the Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
79.	Non-homogeneous Linear PDE with constant coefficients	1	13/06/2026		TLM2	CO2	T1, T2	
No. of classes		1			No. of classes taken:			

II MID EXAMINATIONS (15-06-2026 TO 20-06-2026)

Teaching Learning Methods

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

TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C
EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (UNIT-III, IV & V)	M2=15
II-Quiz Examination (UNIT-III, IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE):	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 professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mr.B.Tandava Krishna	**Dr. K.Jhansi Rani**	**Dr. A. Rami Reddy**	**Dr.T.Satyanarayana**
Course Instructor	Course Coordinator	Module Coordinator	HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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Accredited by NAAC with Grade 'A' & ISO: 21001:2018, 50001:2018, 14001:2015 certified
Department of Electrical and Electronics Engineering
Accredited by NBA under Tier-I

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.R.ANJANEYULU NAIK
Course Name & Code **:** BASIC ELECTRICAL & ELECTRONICS ENGINEERING – 23EE01
L-T-P Structure **: 3-0-0** **Credits:** 3
Program/Branch/Sem/Sec: B.Tech/AI&DS, A Sec II SEM **A.Y.:** 2025-26

Pre-requisites: Physics
Course Educational Objective:

- To expose to the field of electrical & electronics engineering, laws and principles of electrical/ electronic engineering and to acquire fundamental knowledge in the relevant field.
- To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

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

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

CO-PO Articulation Matrix:

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

Textbooks:

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

Reference Books:

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

ELECTRICAL ENGINEERING

UNIT-I: DC & AC CIRCUITS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	**DC Circuits:** Introduction:PEOs,PO&PSOs,COs	1	03-02-2026			
2.	Electrical circuit elements	1	04-02-2026		TLM1	
3.	KCL & KVL,Ohm's Law and its limitations	1	05-02-2026		TLM1	
4.	series, parallel, series-parallel circuits	1	06-02-2026		TLM1	
5.	Super Position theorem	1	10-02-2026		TLM1	
6.	**AC Circuits:** Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference	1	11-02-2026		TLM1	
7.	average value, RMS value, form factor, peak factor	1	12-02-2026		TLM2	
8.	Impedance, Power ,RLC Circuits	1	13-02-2026		TLM1	
9.	Simple numerical problems	1	17-02-2026			
No. of classes required to complete UNIT-I: 09				**No. of classes taken:**		

UNIT – II: MACHINES AND MEASURING INSTRUMENTS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	**Machines:** Construction, principle and operation of (i) DC Motor	1	20-02-2026		TLM2	
11.	Construction, principle and operation of (ii) DC Generator.	1	24-02-2026		TLM2	
12.	Single Phase Transformer	1	25-02-2026		TLM2	
13.	Three Phase Induction Motor	1	26-02-2026		TLM2	
14.	Alternators, Applications of electrical machines	1	27-02-2026		TLM2	
15.	**Measuring Instruments:** Construction and working	1	03-03-2026		TLM2	

	principle of Permanent Magnet Moving Coil (PMMC)					
16.	Moving Iron (MI) Instruments & Wheatstone bridge	1	05-03-2026		TLM2	
No. of classes required to complete UNIT-II: 07				**No. of classes taken:**		

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
17.	Conventional and non-conventional energy resources, Hydel & Nuclear power generation	1	06-03-2026		TLM2	
18.	Solar & Wind power plants	1	10-03-2026		TLM2	
19.	Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc	1	11-03-2026		TLM2	
20.	Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.	1	12-03-2026		TLM2	
21.	Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits.	1	13-03-2026		TLM2	
22.	Personal safety measures: Electric Shock, Earthing and its types& Safety Precautions	1	17-03-2026		TLM2	
23.	**Beyond the Syllabus**: Thermal Power Plant	1	18-03-2026			
No. of classes required to complete UNIT-III: 7				**No. of classes taken:**		

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

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	31-03-2026		TLM1	
2.	Evolution of electronics, Vacuum tubes to nano electronics	1	01-04-2026		TLM1	
3.	Characteristics of PN Junction Diode	1	02-04-2026		TLM1	
4.	Zener Effect — Zener Diode and its Characteristics	1	07-04-2026		TLM1	
5.	Zener Effect — Zener Diode and its Characteristics	1	08-04-2026		TLM1	
6.	Bipolar Junction Transistor	1	09-04-2026		TLM1	
7	CB Configurations and Characteristics	1	15-04-2026		TLM2	
8.	CE,CC Configurations and Characteristics.	1	16-04-2026		TLM2	
9	Elementary Treatment of Small Signal CE Amplifier.	1	17-04-2026		TLM1	
No. of classes required to complete UNIT-I: 9				**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
10	**Rectifiers and power supplies**: Block diagram description of a DC power supply	1	21-04-2026		TLM1	
11	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	22-04-2026		TLM1	
12	Working of simple Zener voltage regulator.	1	24-04-2026		TLM1	
13	**Amplifiers**: Block diagram of Public Address system	1	28-04-2026		TLM2	
14	Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response.	1	29-04-2026		TLM2	
15	**Electronic Instrumentation:** Block diagram of an electronic instrumentation system.	1	30-04-2026		TLM2	
No. of classes required to complete UNIT-II: 06				**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
16	Overview of Number Systems	1	01-05-2026		TLM1	
17	Logic gates including Universal Gates	1	05-05-2026		TLM2	
18	BCD codes, Excess-3 code	1	06-05-2026		TLM!	
19	Gray code, Hamming code	1	07-05-2026		TLM!	
20	Boolean Algebra basics	1	08-05-2026		TLM1	
21	Basic Theorems and properties of Boolean Algebra	1	12-05-2026		TLM2	
22	Simple combinational circuits	1	13-05-2026		TLM1	

23	Half and Full Adders	1	14-05-2026		TLM1
24	Introduction to sequential circuits, Flip flops,	1	15-05-2026		TLM2
25	Registers and counters	1	02-06-2026		TLM2
26	Review	1	03-06-2026		TLM1
27	**Beyond the syllabus:** Operational Amplifier	1	04-06-2026		TLM1

No. of classes required to complete UNIT-III: 12	**No. of classes taken:**

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

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

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:

Commencement of Class Work	02-02-2026		
I Phase of Instructions	02-02-2026	21-03-2026	7 W
I MID Examinations	**23-03-2026**	**28-03-2026**	**1 W**
II Phase of Instructions	30-03-2026	16-05-2026	7 W
Summer Vacation	18-05-2026	30-05-2026	2 W
II Phase of Instructions	01-06-2026	13-06-2026	2 W
II MID Examinations	**15-06-2026**	**20-06-2026**	**1 W**
Preparation & Practicals	22-06-2026	27-06-2026	1 W
Semester End Examinations	**29-06-2026**	**11-07-2026**	**2 W**

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.
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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.

Date: 30-01-2026

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Mr.R.Anjaneyulu Naik	Dr. AVGA Marthanda	Dr. G.Nageswara Rao	Dr. P.Sobharani

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE(AI&DS)

COURSE HANDOUT

PART-A

Name of Course Instructor(s): **Dr.P.Vijaya Kumar(T532), Mr.K.V.Viswanadh(T572), Mr. S.Umamaheswara Reddy (T840)**

Course Name & Code	**:** Engineering Graphics–23ME01	**Regulations**	**:** R23
L-T-P Structure	**:** 2– 0-3	**Credits**	**:** 03
Program/Sem/Sec	: B.Tech/II SEM AI&DS-A Section	**A.Y.**	**:** 2025-26
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,Charotarpublishers,2012

REFERENCEBOOKS:

R1 Narayana K L, Kannaiah P, Text book on EngineeringDrawing,2nd Edition, Scitech publishers.
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 **UNITI:INTRODUCTION:** Introduction to Engineering Drawing, Principles of Engineering Graphics, and their Significance	2	04-02-2026		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	3	05-02-2026		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
03	**Geometrical Constructions** and Constructing regular polygons by general methods, **Scales**: Plain scales, diagonal scales, and vernier scales	2	11-02-2026		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
04	Engineering **Curves**: Conic Sections, Construction of Ellipse, Parabola, and Hyperbola by general method only	3	12-02-2026		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
05	Construction of Cycloids, Involutes, Normal and Tangent to Curves, Practice	2	18-02-2026		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
06	**Orthographic Projections**: Reference plane, importance of reference lines or Plane, Practice	3	19-02-2026		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
07	Projections of a point situated in any one of the four quadrants, Practice	2	25-02-2026		TLM 1, 2	**CO 1**	**T1, R1 to R5**	
08	Projections of a point situated in any one of the four quadrants, Practice	3	27-02-2026		TLM 1, 2, 3	**CO 1**	**T1, R1 to R5**	
No.of classes required to complete UNIT-I:20(Lecture: 08,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
09	**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	04-03-2026		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
10	Projections of linesinclined to one reference plane and parallel to the other reference plane, Practice	3	05-03-2026		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
11	Projections of Straight Line Inclined to both the reference planes, Practice	2	11-03-2026		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
12	**Projections of Planes:** Projections of Regular planes Perpendicular to both reference planes, parallel to one reference plane, and inclined to the other reference plane, Practice	3	12-03-2026		TLM 1, 2, 3	**CO 2**	**T1, R1 to R5**	
13	Projections of planes inclined to both the reference planes, Practice	2	18-03-2026		TLM 1, 2	**CO 2**	**T1, R1 to R5**	
14	Practice	3	20-03-2026		TLM 1, 2,3	**CO 2**	**T1, R1 to R5**	
-	**I Mid Examinations: From 23-03-2026 to 28-03-2026 (Covered CO 1 & CO 2)**							
No.of classes required to complete UNIT-II:20(Lectures: 06, Practice: 09)			**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	2	01-04-2026		TLM 1, 2	**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	3	02-04-2026		TLM 1, 2,3	**CO 3**	**T1, R1 to R5**	
17	Projection of Solids with axis inclined to one reference plane and parallel to another plane, Practice	2	08-04-2026		TLM 1, 2	**CO 3**	**T1, R1 to R5**	
18	Numericals	3	09-04-2026		TLM 1, 2,3	**CO 3**	**T1, R1 to R5**	
19	Practice	2	15-04-2026		TLM 1, 2	**CO 3**	**T1, R1 to R5**	
20	Practice	3	16-04-2026		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	2	22-04-2026		TLM 1, 2	**CO 4**	**T1, R1 to R5**	
22	Sectional views and True shape of section, Practice	3	23-04-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
23	Sections of solids in simple position only, Numericals	2	29-04-2026		TLM 1, 2	**CO 4**	**T1, R1 to R5**	
24	**Development of Surfaces:** Introduction to Methods of Development of Surfaces, Parallel Line Development (Plane Surfaces), Practice	3	30-04-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
25	Radial Line Development, Numericals	2	06-05-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
26	Practice	3	07-05-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
No.of classes required to complete UNIT-IV:20(Lecture: 06,Practice: 14)			**No. of classes taken (including Practice):**					

UNIT-V: CONVERSION VIEWS & COMPUTER G RAPHICS:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
27	Introduction to Isometric Views, Isometric Views of Planes, Solids	2	13-05-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
28	Conversion of isometric views to orthographic views, Practice	3	14-05-2026		TLM 1, 2, 3	**CO 4**	**T1, R1 to R5**	
29	Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views	2	03-06-2026		TLM 1, 2	**CO 5**	**T1, R1 to R5**	
30	Practice	3	04-06-2026		TLM 1, 2, 3	**CO 5**	**T1, R1 to R5**	
31	**Computer Graphics**: Creating 2D&3D drawings of objects, including PCB and Transformations using Auto CAD	2	10-06-2026		TLM 1, 2	**CO 5**	**T1, R1 to R5**	
32	Practice	3	11-06-2026		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):**					
Summer Vacation: 18-05-20026 to 30-05-2026; II Mid Examinations: From 15-06-20026 to 20-06-2026 (Covered CO 3, CO 4 & CO 5)								

Teaching Learning Methods:

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

PART-C

EVALUATION PROCESS for EG Course (R23 Regulation):

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

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

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

Class Time Table - B.Tech – II Sem: AI&DS 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							
Wednesday		**Engineering Graphics(AI&DS-A)**					
Thursday					**Engineering Graphics(AI&DS-A)**		
Friday							
Saturday							

Day – to – Day work / Submission of Sheets

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

PART-D

Program Educational Objectives (PEOs):

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

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

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

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

Program Outcomes (POs):

PO1 - Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 - Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 - Design / Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 - Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 - Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6 - The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 - Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 - Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 - Project Management and Finance: Demonstrate knowledge and understanding of the ring and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 - Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

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

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

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

Signature				
Name of the Faculty	Dr.P.Vijaya Kumar	Mr. J. Subba Reddy	Mr. J. Subba Reddy	Dr. P.Bhagat
Designation / Title	Professor / Course Instructor	Associate Professor / Course Coordinator	Associate Professor/ Module Coordinator	Professor / Head of the Department

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC with 'A' Grade,
ISO 21001:2018, 50001:2018, 14001:2015 Certified Institution
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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor : Mrs. K. Vinaya Sree Bai
Course Name & Code : Data Structures (23CS02)
L-T-P Structure : 3-0-0 Credits: 3
Program/Sem/Sec : B.Tech/II/A A.Y.: 2025-26

PRE-REQUISITE: Programming for Problem Solving Using C

COURSE EDUCATIONAL OBJECTIVE (CEO):

- To provide the knowledge of basic data structures and their implementations.
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

COURSE OUTCOMES (COs): At the end of the course, the 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		

TEXT BOOKS:

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 Anderson Freed, Silicon Press, 2008

REFERENCE BOOKS:

R1: Algorithms and Data Structures: The Basic Tool box 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 DataStructures" 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	2-2-26		**TLM1**	
2.	Definition and Importance of Linear Data Structures	1	4-2-26		**TLM1**	
3.	Abstract Data Types and Implementation	1	5-2-26		**TLM1**	
4.	Overview of time and space complexity	2	7-2-26 9-2-26		**TLM1**	
5.	Analysis of Liner Data structures	1	11-2-26		**TLM1**	
6.	Revise Arrays	1	12-2-26		**TLM1**	
7.	**Searching Techniques:** Linear Search	1	12-2-26		**TLM1**	
8.	Binary Search & Analysis	2	14-2-26 16-2-26		**TLM1**	
9.	Bubble Sort & Analysis	1	18-2-26		**TLM1**	
10.	Insertion Sort & Analysis	1	19-2-26		**TLM1**	
11.	Selection Sort & Analysis	2	21-2-26 23-2-26		**TLM1**	
12.	Assignment-1	1	25-2-26		**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
13.	List Implementation using Arrays and Array Disadvantages	1	25-2-26		**TLM1**	
14.	Linked List Representation	1	26-2-26		**TLM1**	
15.	Sing Linked List : Operations	3	26-2-26 26-2-26 28-2-26		**TLM1**	
16.	Double Linked List : Operations	2	28-2-26 2-3-26		**TLM1**	
17.	Circular Single Linked List	1	4-3-26		**TLM1**	
18.	Circular Double Linked List	2	5-3-26 7-3-26		**TLM1**	
19.	Comparing Arrays and Linked List	2	9-3-26 11-3-26		**TLM1**	
20.	**Applications of Linked Lists:** Polynomial Representation	2	12-3-26 16-3-26		**TLM1**	
21.	Polynomial Addition	1	18-3-26		**TLM1**	
22.	Revision/Assignment-2	1	20-3-26		**TLM1**	
No. of classes required to complete UNIT – II: 16				**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
23.	Introduction to Stacks : Properties	1	30-3-26		**TLM1**	
24.	Operations of Stacks	1	1-4-26		**TLM1**	
25.	Implementation of stacks using arrays	1	2-4-26		**TLM1**	
26.	Stacks using Linked List	1	4-4-26		**TLM1**	
27.	Expressions: Expression evaluation	2	6-4-26 8-4-26		**TLM1**	

28.	Infix to Postfix Conversion	2	9-4-26 13-4-26		**TLM1**	
29.	Checking Balanced Parenthesis	2	15-4-26 16-4-26		**TLM1**	
30.	Reversing a List	1	18-4-26		**TLM1**	
31.	Backtracking	1	20-4-26		**TLM1**	
32.	Assignment-3	1	22-4-26		**TLM1**	
No. of classes required to complete UNIT – III: 13				**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
33.	**Introduction to queues:** properties and operations	1	22-4-26		**TLM1**	
34.	Implementing queues using arrays	1	23-4-26		**TLM1**	
35.	Implementing queues using Linked List	1	25-4-26		**TLM1**	
36.	Applications of Queue : Scheduling	1	27-4-26		**TLM1**	
37.	Breadth First Search	1	29-4-26		**TLM1**	
38.	Circular Queue	2	30-4-26 2-5-26		**TLM1**	
39.	Double ended queue	2	4-5-26 6-5-26		**TLM1**	
40.	Applications of Deque	1	7-5-26		**TLM1**	
41.	Revision/ Assignment-4	1	11-5-26		**TLM1**	
No. of classes required to complete UNIT – IV: 11				**No. of classes taken:**		

UNIT – V: Trees & Hashing Techniques

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.	Introduction to Trees	1	11-5-26		**TLM1**	
43.	Representation of Trees	1	13-5-26		**TLM1**	
44.	Tree Traversals	1	14-5-26		**TLM1**	
45.	Binary Search Trees Operations	3	16-5-26 1-6-26 3-6-26		**TLM1**	
46.	Hashing Introduction	1	4-6-26		**TLM1**	
47.	Hash Functions	1	6-6-26		**TLM1**	
48.	Collison Resolution Techniques: Separate Chaining	1	6-6-26		**TLM1**	
49.	Open Addressing: Linear Probing	1	8-6-26		**TLM1**	
50.	Quadratic Probing, Double Hashing	2	8-6-26 10-6-26		**TLM1**	
51.	Rehashing	1	10-6-26		**TLM1**	
52.	Applications of Hashing	1	11-6-26		**TLM1**	
53.	All Units Revision	1	11-6-26		**TLM1**	
No. of classes required to complete UNIT – V: 14				**No. of classes taken:**		

Content Beyond the Syllabus:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
54.	Evaluation of Prefix Expression	1	12-6-26		**TLM1**	
55.	Towers of Hanoi	1	13-6-26		**TLM1**	
56.	Extendable Hashing	1	13-6-26		**TLM1**	

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

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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 modelling 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 teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a 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 engaging independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO3	To provide a concrete foundation and enrich their abilities for Employment and Higher studies in Artificial Intelligence and Data science with ethical values.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mrs. K. Vinaya Sree Bai**	**Dr. Y. V. Bhaskar Reddy**	**Dr. D. Srinivasa Rao**	**Dr. P. Bhagath**
Signature				

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:**	**B.Tech.,II-Sem.,AIDS-A**
ACADEMIC YEAR	**:**	**2025-26**
COURSE NAME &CODE	**:**	**ENGINEERING PHYSICS LAB**
L-T-P STRUCTURE	**:**	**0 – 0 – 3**
COURSE CREDITS	**:**	**1**
COURSE INSTRUCTOR	**:**	**Dr. K. Kumara Raja / Dr. N. Aruna**
COURSE COORDINATOR	**:**	
Pre-requisites	**:**	**Nil**

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

Course Outcomes:

CO1: Analyze the wave properties of light using optical instruments (Apply-L3).
CO2: Estimate the elastic 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 PO's →	**Programme Outcomes**											
	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)**												

List of Experiments

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

References:

- A Textbook of Practical Physics – S. Bala subramanian, M.N. Srinivasan, S. Chand publishers-2017.

BOS APPROVED TEXTBOOKS:

1. Lab Manual Prepared by the LBRCE.

EVALUATIONPROCESS:

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

Part-B

COURSEDELIVERYPLAN (LESSONPLAN): AIDS-A

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
1.	Introduction & Demonstration	3	7.2.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
2.	Experiment1	3	14.2.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
3.	Experiment2	3	21.2.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
4.	Experiment3	3	28.2.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
5.	Experiment 3	3	7.3.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
6.	Experiment 4	3	14.3.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
7.	**MID-1 Exam**	3	28.3.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
8.	Experiment5	3	4.4.26		---	---	---	
9.	Experiment 6	3	11.4.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
10.	Experiment 7	3	18.4.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
11.	Experiment8	3	25.4.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
12.	Experiment 8	3	2.5.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
13.	Experiment 9	3	9.5.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
14.	Experiment 10	3	16.5.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
15.	**Internal Exam**	3	6.6.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
16.	**Internal Exam**	3	13.6.26		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
17.	**MID-2 Exam**	3	20.6.26		---	---	---	

No.of classes required to completed	16	No.of classes taken:

PROGRAM OUT COMES: 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 ofcomplex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of theinformationto provide valid conclusions.

(5). **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modernengineering and IT tools including prediction and modeling to complex engineering activities with anunderstandingofthelimitations.

(6). **The engineer and society**: Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

(7). Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

(9). **Individual and 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 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.

CourseInstructor	CourseCoordinator	ModuleCoordinator	H.O.D
Dr. K. Kumar Raja/ Dr. N. Aruna	**Dr.S.YUSUF**	**Dr.S.YUSUF**	**Dr.T. Satyanarayana**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(Autonomous)
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Accredited by NAAC with Grade 'A' & ISO: 21001:2018, 50001:2018, 14001:2015 certified
Department of Electrical and Electronics Engineering
Accredited by NBA under Tier-I

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.R.ANJANEYULU NAIK. Dr.G.Nageswara Rao, Dr.M.S.Giridhar, Mr.P.Ratnakar Kumar

Course Name & Code : ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP & 23EE51

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

Program/Branch/Sem/Sec: B.Tech/AI&DS A sec, II SEM **A.Y.:** 2025-26

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

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

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

COURSE ARTICULATION MATRIX (Correlation between COs & POs):

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

PART-B

ELECTRICAL ENGINEERING

COURSE DELIVERY PLAN (LESSON PLAN):

S.No.	Topics to be covered. (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to BEEE Lab , Importance of Electrical Lab, its Objectives and Outcomes, BASIC MEASURING METERS, SAFETY PRECAUATIONS & Other suggestions.	3	02-02-2026		TLM4	
2.	Verification of KCL and KVL	3	09-02-2026		TLM4	
3.	Verification of Superposition theorem	3	16-02-2026		TLM4	
4.	Measurement of Resistance using Wheat stone bridge	3	23-02-2026		TLM4	
5.	Magnetization Characteristics of DC shunt Generator	3	02-03-2026		TLM4	
6.	Measurement of Power and Power factor using Single-phase wattmeter	3	09-03-2026		TLM4	
7.	Calculation of Electrical Energy for Domestic Premises	3	16-03-2026		TLM4	
8.	Revision	3	30-03-2026		TLM4	
9.	Internal Lab Examination (**Electrical**)	3	06-04-2026			

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

ELECTRONICS ENGINEERING

COURSE DELIVERY PLAN (LESSON PLAN):

S.No.	Topics to be covered. (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to BEEE Lab (Function Generators, CRO, RPS, Breadboard etc), Course Objectives and Outcomes.	3	13-04-2026		TLM4	
2.	Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.	3	20-04-2026		TLM4	
3.	Plot V – I characteristics of Zener Diode and its application as voltage Regulator	3	27-04-2026		TLM4	
4.	Implementation of half wave and full wave rectifiers	3	04-05-2026		TLM4	
5.	Plot Input & Output characteristics of BJT in CB configuration	3	11-05-2026		TLM4	
6.	Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs	3	18-05-2026		TLM4	
7.	Verification of Truth Tables of S-R, J- K& D flip flops using respective ICs	3	25-05-2026		TLM4	
8.	Revision	3	01-06-2026		TLM4	
9	Internal Lab Examination (**Electronics**)	3	08-06-2026		TLM4	

PART-C

EVALUATION PROCESS (R23 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.

Date: 30-01-2026

Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Mr.R.Anjaneyulu Naik	Dr. AVGA Marthanda	Dr. G.Nageswara Rao	Dr. P.Sobharani

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. K. HARISH KUMAR/Mrs. P. KEERTHI

Course Name& Code	**:**Engineering Workshop &23ME51	**Regulation**	: R23
L-T-P Structure	**:0-0-3**	**Credits**	: 1.5
Program/Sem/Sec	**:**B. Tech/II/AI&DS-A	**A.Y.**	:2025-26

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							

Text books:

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 (LESSONPLAN):

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
	CYCLE-I					
1.	Introduction to Lab	3	03-02-2026		TLM4	
2.	Dove Tail Joint	3	10-02-2026		TLM4	
3.	Corner Lap Joint	3	17-02-2026		TLM4	
4.	T-Fitting	3	24-02-2026		TLM4	
5.	V-Fitting	3	10-03-2026		TLM4	
6.	Two Laps in Series and Parallel Connection with One Way Switch	3	17-03-2026		TLM4	
7.	Florescent Lamp and Calling Bell Circuit	3	31-03-2026		TLM4	
	CYCLE-II					
8.	Preparation of Pipe Layout	3	07-04-2026		TLM4	
9.	Pipe Threading	3	21-04-2026		TLM4	
10.	Preparation of Rectangular Tray	3	28-04-2026		TLM4	
11.	Preparation of Open Scoop	3	05-05-2026		TLM4	
12.	Preparation Of S-Hook	3	12-05-2026		TLM4	
13.	Preparation of chisel,	3	02-06-2026		TLM4	
14.	Internal Lab Exam	3	09-06-2026		-----	
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):

PEO1	To Attain a solid foundation in Electronics & Communication Engineering fundamentals with an attitude to pursue continuing education.
PEO2	To Function professionally in the rapidly changing world with advances in technology.
PEO3	To Contribute to the needs of the society in solving technical problems using Electronics & Communication Engineering principles, tools and practices.
PEO4	To Exercise leadership qualities, at levels appropriate to their experience, which addresses issues in a responsive, ethical, and innovative manner?

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 modeling 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):

PSO1	Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
PSO2	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
PSO 3	Apply the Signal processing techniques to synthesize and realize the issues related to real time applications.

	Course Instructor	**Head of the Department**
Signature		
Name of the Faculty	Mr. K HARISH KUMAR	Dr. K V RAMANA

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L.B.REDDY NAGAR, MYLAVARAM. NTR District, AP, India. 521230.
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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor : Mrs. K. Vinaya Sree Bai

Course Name & Code : Data Structures Lab (23CS52)

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

Program/Sem/Sec : B.Tech./AI&DS/II/A A.Y.: 2025-26

PRE-REQUISITE: Computer Programming Lab

COURSE EDUCATIONAL OBJECTIVE (CEO):

The course aims to strengthen the ability of the students to identify and apply the suitable data structure for the given real-world problem. It enables them to gain knowledge in practical applications of data structures

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

CO1	Apply Linear Data Structures for organizing the data efficiently **(Apply-L3)**
CO2	Apply Non-Linear Data Structures to organize data efficiently **(Apply-L3)**
CO3	Developandimplementhashingtechniquesforsolvingproblems.**(Apply-L3)**
CO4	Improve individual / teamwork skills, communication and 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	-	-	-
1 –Low								**2** –Medium					**3**– High		

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Programs to be covered	No. of Classes		Date of Completion	Delivery Method
		Required as per the Schedule	Taken		
1.	**Week 1:** Array Manipulation	03	6-2-26		DM5
2.	**Week 2:** Searching and Sorting Techniques	03	13-2-26 & 20-2-26		DM5
3.	**Week 3:** Single Linked List	03	27-2-26		DM5
4.	**Week 4:** Double Linked List	03	6-3-26		DM5
5.	**Week 5:** Circular Linked List	03	13-3-26		DM5
6.	**Week 6:** Polynomial Representation & Polynomial Addition	03	20-3-26		DM5
7.	**Week 7:** Linked List Applications	03	10-4-26		DM5
8.	**Week 8:** Stack Implementation	03	17-4-26		DM5
9.	**Week 9:** Stack Applications	03	24-4-26		DM5
10.	**Week 10:** Queue Implementation & Circular Queue	03	1-5-26		DM5
11.	**Week 11:** Double Ended Queue	03	8-5-26		DM5
12.	**Week 12:** Trees, Hashing	03	15-5-26		DM5
13.	Revision of All Weeks	03	5-6-26		DM5
14.	Lab Internal	03	12-6-26		DM5

Delivery Methods			
DM1	Chalk and Talk	**DM4**	Assignment/Test/Quiz
DM2	ICT Tools	**DM5**	Laboratory/Field Visit
DM3	Tutorial	**DM6**	Web-based Learning

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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.
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PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a 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 engaging independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO3	To provide a concrete foundation and enrich their abilities for Employment and Higher studies in Artificial Intelligence and Data science with ethical values.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mrs. K. Vinaya Sree Bai**	**Dr. Y. V. Bhaskar Reddy**	**Dr. D. Srinivasa Rao**	**Dr. P. Bhagath**
Signature				