FRESHMANENGINEERINGDEPARTMENT

COURSEHANDOUT

PART-A

PROGRAM	**:I B.Tech.,II-Sem.,AIDS-A**
ACADEMICYEAR	**:2024-25**
COURSENAME &CODE	**: ENGINEERING PHYSICS**
L-T-PSTRUCTURE	**:4-0-0**
COURSECREDITS	**3**
COURSEINSTRUCTOR	**:Dr. P. Sobhanachalam**
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	20.1.25		**TLM-2**		
2.	Principle of superposition, Interference of light	1	21.1.25		**TLM-3**		
3.	Interference in thin films by reflection & applications	1	23.1.25		**TLM-2**		
4.	Colors in thin films, Newton's rings	1	27.1.25		**TLM-1**		
5.	Determination of wavelength and refractive index	1	28.1.25		**TLM-4**		
6.	Problems& Assignment/Quiz	1	30.1.25		**TLM-1**		
7.	Introduction, Fresnel and	1	1.2.25		**TLM-3**		

	Fraunhoffer diffractions						
8.	Fraunhoffer diffraction due to single slit	1	3.2.25		**TLM-2**		
9.	Double slit& N slits(Qualitative)	1	4.2.25		**TLM-4**		
10.	Diffraction Grating, Dispersive power & Resolving power of Grating-Qualitative	1	6.2.25		**TLM-4**		
11.	Problems& Assignment/Quiz	1	8.2.25		**TLM-3**		
12.	Introduction – Types of polarization	1	10.2.25		**TLM-2**		
13.	Polarization by reflection, refraction & double refraction	1	11.2.25		**TLM-2**		
14.	Nicol's prism	1	13.2.25		**TLM-5**		
15.	Half wave and Quarter wave plates	1	15.2.25		**TLM-2**		
16.	Problems& Assignment/Quiz	1	17.2.25		**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	18.2.25		**TLM-3**		
2.	Bravais Lattices	1	20.2.25		**TLM-2**		
3.	Crystal Systems(3D)	1	22.2.25		**TLM-2**		
4.	Coordination number – Packing fraction of –SC, BCC	1	24.2.25		**TLM-1**		
5.	Coordination number – Packing fraction of FCC	1	25.2.25		**TLM-1**		
6.	Miller indices& Properties	1	27.2.25		**TLM-2**		
7.	Separation between successive (hkl) planes	1	1.3.25		**TLM-1**		

8.	Bragg's law; X–ray Diffractometer	1	3.3.25		**TLM-3**		
9.	Crystal Structure determination by Laue's method	1	4.3.25		**TLM-2**		
10.	Crystal Structure determination by Powder method	1	6.3.25		**TLM-5**		
11.	Problems& Assignment/Quiz	1	8.3.25		**TLM-3**		
12.	MID-1 Examinations	1	10.4.25		----		
13.	MID-1 Examinations	1	11.3.25		----		
14.	MID-1 Examinations	1	15.3.25		----		
No.of classes required to complete UNIT-II: 14				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	17.3.25		**TLM-2**		
2.	Dielectric constant & Displacement Vector, Relation between the electric vectors	1	18.3.25		**TLM-3**		
3.	Types of polarizations-Electronic polarization	1	20.3.25		**TLM-1**		
4.	Types of polarizations- ionic & orientation polarizations (Qualitative)	1	22.3.25		**TLM-1**		
5.	Lorentz internal field	1	24.3.25		**TLM-2**		
6.	Claussius-Mosotti equation, Complex dielectric constant	1	25.3.25		**TLM-1**		
7.	Frequency dependence of polarization dielectric loss	1	27.3.25		**TLM-5**		
8.	Problems& Assignment/Quiz	1	29.3.25		**TLM-3**		

9.	Introduction Magnetic dipole moment, Magnetization Magnetic susceptibility & permeability	1	31.3.25		**TLM-4**		
10.	Atomic origin of magnetism	1	1.4.25		**TLM-1**		
11.	Classification of magnetic materials-Dia, para, Ferro, anti-ferro & Ferri magnetic materials	1	3.4.25		**TLM-2**		
12.	Domain concept for Ferromagnetism & Domain walls	1	7.4.25		**TLM-2**		
13.	Hysteresis	1	8.4.25		**TLM-5**		
14.	soft and hard magnetic materials	1	10.4.25		**TLM-1**		
15.	Problems& Assignment/Quiz	1	12.4.25		**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	14.4.25		**TLM-2**		
2.	Heisenberg's Uncertainty Principle	1	15.4.25		**TLM-2**		
3.	Significance & properties of wave function	1	17.4.25		**TLM-2**		
4.	Schrodinger's time independent and dependent wave equations	1	19.4.25		**TLM-1**		
5.	Particle in a one – dimensional infinite potential well	1	21.4.25		**TLM-1**		
6.	Problems& Assignment/Quiz	1	22.4.25		**TLM-3**		
7.	Classical free electron theory-merits and demerits, Quantum free electron theory	1	24.4.25		**TLM-2**		
8.	Electrical conductivity based on quantum free electron theory	1	26.4.25		**TLM-1**		

9.	Fermi -Dirac distribution and temperature dependence	1	28.4.25		**TLM-5**		
10.	Density of states, Fermi energy	1	29.4.25		**TLM-1**		
11.	Problems& Assignment/Quiz	1	1.5.25		**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	3.5.25		**TLM-6**		
2.	Intrinsic semiconductors, Density of charge carriers	1	5.5.25		**TLM-1**		
3.	Electrical conductivity, Fermi level	1	6.5.25		**TLM-2**		
4.	Extrinsic semiconductors, Density of charge carriers	1	8.5.25		**TLM-1**		
5.	Dependence of Fermi energy on carrier concentration &temperature	1	10.5.25		**TLM-2**		
6.	Drift and Diffusion Currents, Einstein's equation	1	12.5.25		**TLM-1**		
7.	Hall Effect & its applications	1	13.5.25		**TLM-4**		
8.	Problems& Assignment/Quiz	1	15.5.25		**TLM-3**		
9.	Problems& Assignment/Quiz	1	17.5.25		**TLM-3**		
10.	MID-2 Examinations	1	2.6.25		----		
11.	MID-2 Examinations	1	3.6.25		----		
12.	MID-2 Examinations	1	5.6.25		----		
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.

CourseInstructor	CourseCoordinator	ModuleCoordinator	HOD
Dr. P. Sobhanachalam	**Dr.S.YUSUF**	**Dr.S.YUSUF**	**Dr.A.RAMIREDDY**

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

COURSE HANDOUT

Part-A

PROGRAM	**:** I B. Tech., II-Sem., AI & DS - 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. D. VIJAY KUMAR
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	22-01-2025		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.	TUTORIAL - 1	1	29-01-2025		TLM3	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.	Newton's Law of cooling	1	05-02-2025		TLM1	CO1	T1,T2	
14.	TUTORIAL - 2	1	05-02-2025		TLM3	CO1	T1,T2	
15.	Law of natural growth and decay	1	07-02-2025		TLM1	CO1	T1,T2	
16.	Electrical circuits	1	10-02-2025		TLM1	CO1	T1,T2	
No. of classes required to complete UNIT-I		14			No. of classes taken:			

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Introduction to UNIT II	1	11-02-2025		TLM1	CO1	T1,T2	
18.	Solving a homogeneous DE	1	12-02-2025		TLM1	CO1	T1,T2	
19.	Finding Particular Integral, P.I for e^{ax+b}	1	12-02-2025		TLM1	CO1	T1,T2	
20.	P.I for Cos bx, or sin bx	1	14-02-2025		TLM1	CO1	T1,T2	
21.	P.I for polynomial function	1	17-02-2025		TLM1	CO1	T1,T2	
22.	P.I for $e^{ax+b}v(x)$	1	18-02-2025		TLM1	CO1	T1,T2	
23.	TUTORIAL - 3	1	19-02-2025		TLM3	CO1	T1,T2	
24.	P.I for $x^k v(x)$	1	19-02-2025		TLM1	CO1	T1,T2	
25.	Method of Variation of parameters	1	21-02-2025		TLM1	CO1	T1,T2	

26.	Method of Variation of parameters	1	24-02-2025		TLM1	CO1	T1,T2	
27.	TUTORIAL - 4	1	25-02-2025		TLM3	CO1	T1,T2	
28.	Simultaneous linear equations	1	28-02-2025		TLM1	CO1	T1,T2	
29.	L-C-R circuits	1	03-03-2025		TLM1	CO1	T1,T2	
30.	Simple Harmonic motion	1	04-03-2025		TLM1	CO1	T1,T2	
31.	TUTORIAL - 5	1	05-03-2025		TLM3	CO1	T1,T2	
32.	Revision	1	07– 03 – 25					
No. of classes required to complete UNIT-II		16			No. of classes taken:			

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

UNIT-III: Partial Differential Equations

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
33.	Introduction to Unit III	1	17-03-2025		TLM1	CO2	T1,T2	
34.	Formation of PDE by elimination of arbitrary constants	1	18-03-2025		TLM1	CO2	T1,T2	
35.	Formation of PDE by elimination of arbitrary functions	1	19-03-2025		TLM1	CO2	T1,T2	
36.	Formation of PDE by elimination of arbitrary functions	1	19-03-2025		TLM1	CO2	T1,T2	
37.	Solving of PDE	1	21-03-2025		TLM1	CO2	T1,T2	
38.	Lagrange's Method	1	24-03-2025		TLM1	CO2	T1,T2	
39.	Lagrange's Method	1	25-03-2025		TLM1	CO2	T1,T2	
40.	Homogeneous Linear PDE with constant coefficients	1	26-03-2025		TLM1	CO2	T1,T2	
41.	TUTORIAL - 6	1	26-03-2025		TLM3	CO2	T1,T2	
42.	Homogeneous Linear PDE with constant coefficients	1	28-03-2025		TLM1	CO2	T1,T2	
43.	Homogeneous Linear PDE with constant coefficients	1	01-04-2025		TLM1	CO2	T1,T2	
No. of classes required to complete UNIT-III		11			No. of classes taken:			

UNIT-IV: Vector Differentiation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
44.	Introduction to UNIT IV	1	02-04-2025		TLM1	CO3	T1,T2	
45.	Vector Differentiation	1	02-04-2025		TLM1	CO3	T1,T2	
46.	TUTORIAL - 7	1	04-04-2025		TLM3	CO3	T1,T2	
47.	Gradient	1	07-04-2025		TLM1	CO3	T1,T2	
48.	Directional Derivative	1	08-04-2025		TLM1	CO3	T1,T2	

49.	Divergence	1	09-04-2025		TLM1	CO3	T1,T2	
50.	TUTORIAL - 8	1	09-04-2025		TLM3	CO3	T1,T2	
51.	Curl	1	11-04-2025		TLM1	CO3	T1,T2	
52.	Solenoidal fields, Irrotational fields, potential surfaces	1	15-04-2025		TLM1	CO3	T1,T2	
53.	Solenoidal fields, Irrotational fields, potential surfaces	1	16-04-2025		TLM1	CO3	T1,T2	
54.	Laplacian, second order operators	1	16-04-2025		TLM1	CO3	T1,T2	
55.	Vector Identities	1	21-04-2025		TLM1	CO3	T1,T2	
56.	Vector Identities	1	22-04-2025		TLM1	CO3	T1,T2	
57.	TUTORIAL - 9	1	23-04-2025		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	23-04-2025		TLM1	CO4	T1,T2	
59.	Line Integral	1	25-04-2025		TLM1	CO4	T1,T2	
60.	Circulation	1	28-04-2025		TLM1	CO4	T1,T2	
61.	Work done	1	29-04-2025		TLM1	CO4	T1,T2	
62.	Surface Integral, Flux	1	30-04-2025		TLM1	CO4	T1,T2	
63.	TUTORIAL - 10	1	30-04-2025		TLM3	CO4	T1,T2	
64.	Volume Integral	1	03-05-2025		TLM1	CO4	T1,T2	
65.	Green's Theorem	1	02-05-2025		TLM1	CO4	T1,T2	
66.	Green's Theorem	1	05-05-2025		TLM1	CO4	T1,T2	
67.	Stoke's Thoerem	1	06-05-2025		TLM1	CO4	T1,T2	
68.	TUTORIAL - 11	1	07-05-2025		TLM3	CO4	T1,T2	
69.	Divergence Theorem	1	07-05-2025		TLM1	CO4	T1,T2	
70.	Divergence Theorem	1	09-05-2025		TLM1	CO4	T1,T2	
71.	Revision	1	12-05-2025					
No. of classes required to complete UNIT-V		14			No. of classes taken:			

Content beyond the Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
72.	Non-homogeneous Linear PDE with constant coefficients	2	13-05-2025, 14-05-2025		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. D. VIJAY KUMAR	**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)

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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.B.Rambabu

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

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

Program/Sem./Sec. : B.Tech/II/AI&DS-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&DS-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	2	25-01-2025		TLM1	
4.	Zener Effect — Zener Diode and its Characteristics	1	28-01-2025		TLM1	
5.	Zener Effect — Zener Diode and its Characteristics	1	31-01-2025		TLM1	
6.	Bipolar Junction Transistor	2	01-02-2025		TLM1	
7.	Bipolar Junction Transistor	1	04-01-2025		TLM1	
8.	CB Configurations and Characteristics	1	07-02-2025		TLM2	
9.	CE,CC Configurations and Characteristics.	2	08-02-2025		TLM2	
10.	Elementary Treatment of Small Signal CE Amplifier.	1	11-02-2025		TLM1	
No. of classes required to complete UNIT-I: 13				**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	14-02-2025		TLM1	
12.	Working of full wave bridge rectifier, capacitor filter (no analysis)	2	15-02-2025		TLM1	
13.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	18-02-2025		TLM1	
14.	Working of simple Zener voltage regulator.	1	21-02-2025		TLM1	
15.	**Amplifiers**: Block diagram of Public Address system	2	22-02-2025		TLM2	
16.	Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response.	1	25-02-2025		TLM2	
17.	**Electronic Instrumentation:** Block diagram of an electronic instrumentation system.	1	28-02-2025		TLM2	
No. of classes required to complete UNIT-II: 09				**No. of classes taken:**		

UNIT-III: Digital Electronics

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Overview of Number Systems Logic gates including Universal Gates,	2	1-03-2025		TLM2	
19.	BCD codes, Excess-3 code, gray code	1	04-03-2025		TLM1	

20.	Hamming code, Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Simple combinational circuits	1	07-03-2025		TLM2	
21.	Half and Full Adders, Introduction to sequential circuits, Flip flops,	2	08-03-2025		TLM1	
22.	Registers and counters	1	11-03-2025		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 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.B.Rambabu	Dr. P. Rakesh Kumar	Dr. T. Satyanarayana	Dr. G. Srinivasulu

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(Autonomous Status Since the Academic Year 2010-11 & Extended up to 2031-32)
NAAC Accredited with CGPA of 3.20 on 4-point scale at 'A' Grade
NIRF-2022 (Positioned in the Band of 251-300 in the Engineering Category)
NIRF-2023 (Positioned in the Band of 101-150 in the Innovation Category)
NBA Accredited under Tier-I (ECE, EEE, CSE, IT, ME, CIV, ASE)
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L.B.Reddy Nagar, Mylavaram-521230, N.T.R Dist., Andhra Pradesh, India.
Department of Civil Engineering

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. K. Harish Kumar, Sr. Assistant Professor
Dr. K. V. Ramana, Associate Professor,
Mr. M. Karthik Kumar, Assistant Professor

Course Name & Code : Engineering Graphics–23ME01
L-T-P Structure : **3-0-4** **Credits:** 3
Program/Sem/Sec : B.Tech, II SEM, AI&DS-A sec **A.Y.:**2024-25

PREREQUISITE: Engineering Physics, Mathematics

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To enable the students with various concepts like dimensioning, conventions and standards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve 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. (**Understand**)
CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views. (**Apply**)
CO3	Understand and draw projection of solids in various positions in first quadrant. (**Apply**)
CO4	Able to draw the development of surfaces of simple objects (**Apply**)
CO5	Prepare isometric and orthographic sections of simple solids. (**Apply**)

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

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

TEXTBOOKS:

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

REFERENCE BOOKS:

R1 Engineering Drawing, K.L. Narayana and P. Kannaiah, Tata McGraw Hill, 2013.
R2 Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc, 2009.
R3 Engineering Drawing with an Introduction to AutoCAD, DhananjayJolhe, Tata McGraw Hill, 2017

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to CO's, PO's &Basics to Engineering Graphics	02	16.01.2025		**TLM1**	
2.	Lines, Lettering and Dimensioning - Construction of polygons-theory	03	20.01.2025		**TLM1**	
3.	Scales: Plain scales, diagonal scales and vernier scales	02	23.01.2025		**TLM1**	
4.	Practice session	03	27.01.2025		**TLM4**	
5.	Construction of Ellipse, parabola & hyperbola -theory	02	30.01.2025		**TLM1**	
6.	Practice session	03	03.02.2025		**TLM4**	
7.	Construction of Cycloid, Epicycloid & hypocycloid-theory	02	06.02.2025		**TLM1**	
8.	Practice session	03	10.02.2025		**TLM4**	
9.	Involutes & Projection of points -theory	02	13.02.2025		**TLM1**	
10.	Practice Session	03	17.02.2025		**TLM4**	
No. of classes required to complete UNIT-I: 25				**No. of classes taken:**		

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Projection of straight lines (inclined to VP/HP, inclined to one plane and parallel to other plane)-theory	02	20.02.2025		**TLM1**	
12.	Practice Session	03	24.02.2025		**TLM4**	
13.	Projection of straight lines & planes	02	27.02.2025		**TLM1**	
14.	Practice Session	03	03.03.2025		**TLM4**	
15.	Projection of planes – both inclined & Practice Session	02	06.03.2025		**TLM1**	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		
MID-1 Examination				**10.03.2025 – 15.03.2025**		

UNIT-III: PROJECTIONS OF SOLIDS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Types of solids simple positions -theory & practice	03	17.03.2025		**TLM4**	
17.	Projections of solids Axis parallel & perpendicular to both planes -theory	02	20.03.2025		**TLM1**	
18.	Practice Session	03	24.03.2025		**TLM4**	
19.	Projections of solids-axis inclined to VP/HP	02	27.03.2025		**TLM1**	
20.	Practice Session	02	03.04.2025		**TLM4**	
No. of classes required to complete UNIT-III:12				**No. of classes taken:**		

UNIT-IV: SECTIONS OF SOLIDS & DEVELOPMENT OF SURFACES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Sections of solids- simple positions-theory & practice	03	07.04.2025		**TLM4**	
22.	Sectional views & true shapes - theory	02	10.04.2025		**TLM1**	
23.	Practice Session	02	17.04.2025		**TLM4**	
24.	Parallel & Radial line development-theory	03	21.04.2025		**TLM1**	
25.	Practice Session	02	24.04.2025		**TLM4**	
No. of classes required to complete UNIT-IV: 12				**No. of classes taken:**		

UNIT-V: CONVERSION OF VIEWS & COMPUTER GRAPHICS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Isometric to Ortho views– theory & practice	03	28.04.2025		**TLM1**	
27.	Practice Session – Ortho views	02	01.05.2025		**TLM4**	
28.	Ortho to Isometric views – theory & practice	03	05.05.2025		**TLM1**	
29.	Practice Session - Isometric	02	08.05.2025		**TLM4**	
30.	AutoCAD Basics-theory & practice session	03	12.05.2025		**TLM1**	
31.	Revision / Practice session	02	15.05.2025		**TLM4**	
No. of classes required to complete UNIT-V: 15				**No. of classes taken:**		
Summer Vacation				**19.05.2025 – 31.05.2025**		
MID – II Examination				**02.06.2025 – 07.06.2025**		
Preparation & Practicals				**09.06.2025 – 14.06.2025**		
Semester End Examinations				**16.06.2025 – 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 (R23 Regulation):

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

PART-D

PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

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

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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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	Possesses necessary skill set to analyse and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. K. Harish Kumar	Mr. J. Subba Reddy	Dr.M B S S Reddy	Dr. J. Venkateswara Rao
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
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Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada.
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 (23CS02)
L-T-P Structure : 3-0-0 Credits: 3
Program/Sem/Sec : B.Tech/II/A A.Y.: 2024-25

PRE-REQUISITE: Programming for Problem Solving Using C-20CS01

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		

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 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	20-1-25		**TLM1**	
2.	Definition and Importance of Linear Data Structures	1	22-1-25		**TLM1**	
3.	Abstract Data Types and Implementation	1	24-1-25		**TLM1**	
4.	Overview of time and space complexity	2	25-1-25 27-1-25		**TLM1**	
5.	Analysis of Liner Data structures	1	29-1-25		**TLM1**	
6.	Revise Arrays	1	31-1-25		**TLM1**	
7.	**Searching Techniques:** Linear Search	1	1-2-25		**TLM1**	
8.	Binary Search & Analysis	2	3-2-25 5-2-25		**TLM1**	
9.	Bubble Sort & Analysis	1	7-2-25		**TLM1**	
10.	Insertion Sort & Analysis	1	10-2-25		**TLM1**	
11.	Selection Sort & Analysis	2	12-2-25 14-2-25		**TLM1**	
12.	Assignment-1	1	15-2-25		**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	15-2-25		**TLM1**	
14.	Linked List Representation	1	17-2-25		**TLM1**	
15.	Sing Linked List : Operations	3	19-2-25 21-2-25 22-2-25		**TLM1**	
16.	Double Linked List : Operations	2	24-2-25 25-2-25		**TLM1**	
17.	Circular Single Linked List	1	28-2-25		**TLM1**	
18.	Circular Double Linked List	2	1-3-25 1-3-25		**TLM1**	
19.	Comparing Arrays and Linked List	2	3-3-25 5-3-25		**TLM1**	
20.	**Applications of Linked Lists:** Polynomial Representation	2	7-3-25 7-3-25		**TLM1**	
21.	Polynomial Addition	1	8-3-25		**TLM1**	
22.	Revision/Assignment-2	1	8-3-25		**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	17-3-25		**TLM1**	
24.	Operations of Stacks	1	19-3-25		**TLM1**	
25.	Implementation of stacks using arrays	1	21-3-25		**TLM1**	
26.	Stacks using Linked List	1	22-3-25		**TLM1**	
27.	Expressions: Expression evaluation	2	24-3-25 26-3-25		**TLM1**	

28.	Infix to Postfix Conversion	2	28-3-25 29-3-25		**TLM1**	
29.	Checking Balanced Parenthesis	2	2-4-25 4-4-25		**TLM1**	
30.	Reversing a List	1	7-4-25		**TLM1**	
31.	Backtracking	1	9-4-25		**TLM1**	
32.	Assignment-3	1	11-4-25		**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	12-4-25		**TLM1**	
34.	Implementing queues using arrays	1	16-4-25		**TLM1**	
35.	Implementing queues using Linked List	1	19-4-25		**TLM1**	
36.	Applications of Queue : Scheduling	1	21-4-25		**TLM1**	
37.	Breadth First Search	1	23-4-25		**TLM1**	
38.	Circular Queue	2	25-4-25 26-4-25		**TLM1**	
39.	Double ended queue	2	28-4-25 30-4-25		**TLM1**	
40.	Applications of Deque	1	2-5-25		**TLM1**	
41.	Revision/ Assignment-4	1	2-5-25		**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	3-5-25		**TLM1**	
43.	Representation of Trees	1	3-5-25		**TLM1**	
44.	Tree Traversals	1	5-5-25		**TLM1**	
45.	Binary Search Trees Operations	3	7-5-25 7-5-25 9-5-25		**TLM1**	
46.	Hashing Introduction	1	9-5-25		**TLM1**	
47.	Hash Functions	1	10-5-25		**TLM1**	
48.	Collison Resolution Techniques: Separate Chaining	1	10-5-25		**TLM1**	
49.	Open Addressing: Linear Probing	1	12-5-25		**TLM1**	
50.	Quadratic Probing, Double Hashing	2	12-5-25 14-5-25		**TLM1**	
51.	Rehashing	1	14-5-25		**TLM1**	
52.	Applications of Hashing	1	16-5-25		**TLM1**	
53.	All Units Revision	1	16-5-25		**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	16-5-25		**TLM1**	
55.	Towers of Hanoi	1	17-5-25		**TLM1**	
56.	Extendable Hashing	1	17-5-25		**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**	**Mr. S. Siva Ramakrishna**	**Dr. O. Rama Devi**
Signature				

FRESHMANENGINEERINGDEPARTMENT

COURSEHANDOUT

Part-A

PROGRAM	**:**	**B.Tech.,II-Sem.,AIDS-A**
ACADEMICYEAR	**:**	**2024-25**
COURSENAME &CODE	**:**	**ENGINEERING PHYSICS LAB**
L-T-PSTRUCTURE	**:**	**0 – 0 – 3**
COURSECREDITS	**:**	**1**
COURSEINSTRUCTOR	**:**	**Dr. P. Sobhanachalam / Dr. N. Aruna**
COURSECOORDINATOR	**:**	

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. Balasubramanian, M.N. Srinivasan, S. Chand publishers-2017.

BOSAPPROVEDTEXTBOOKS:

1. LabManualPreparedbytheLBRCE.

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	23.1.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
2.	Experiment1	3	30.1.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
3.	Experiment2	3	6.2.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
4.	Experiment3	3	13.2.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
5.	Experiment 3	3	20.2.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
6.	Experiment 4	3	27.2.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
7.	Experiment5	3	6.3.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
8.	**MID-1 Exam**	3	13.3.25		---	---	---	
9.	Experiment 6	3	20.3.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
10.	Experiment 7	3	27.3.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
11.	Experiment8	3	3.4.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
12.	Experiment 8	3	10.4.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
13.	Experiment 9	3	17.4.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
14.	Experiment 10	3	24.4.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
15.	**Revision**	3	1.5.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
16.	**Internal Exam**	3	8.5.25		**TLM-4**	CO1, CO2,CO3,CO4 & CO5	T1	
17.	**Internal Exam**	3	15.5.25		**TLM-4**	CO1, CO2,CO3,CO4	T1	

						& CO5		
18.	**MID-2 Exam**	3	5.6.25		---	---	---	
No.of classes required to completed		17			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. P. Sobhanachalam/ Dr. N. Aruna	**Dr.S.YUSUF**	**Dr.S.YUSUF**	**Dr.A. RAMIREDDY**

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

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DEPARTMENT OF ECE

LAB HANDOUT

PART-A

Name of Course Instructor : Dr.B.Rambabu, Dr. P. Rakesh Kumar
Mrs.B.Rajeswari,Mr.N.Dharmachari

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&DS- 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&DS- 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	21-01-2025		TLM4	
2.	Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.	3	28-01-2025		TLM4	
3.	Plot V – I characteristics of Zener Diode and its application as voltage Regulator	3	04-02-2025		TLM4	
4.	Implementation of half wave and full wave rectifiers	3	11-02-2025		TLM4	
5.	Plot Input & Output characteristics of BJT in CB configuration	3	18-02-2025		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	25-02-2025		TLM4	
7.	Internal Lab Examination (**Electronics**)	3	04-03-2025		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.B.Rambabu	Mrs. B. Rajeswari	Dr. T. Satyanarayana	Dr. G. Srinivasulu

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech. II-Sem, AI&DS –A/s

ACADEMIC YEAR : 2024-25

COURSE NAME & CODE : Engineering Workshop, 23ME51

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

COURSE CREDITS : 1.5

COURSE INSTRUCTOR : Dr. P. Vijaya Kumar (T532), Professor
Dr. A.Dhanunjay Kumar(T811), Sr.Asst Professor

COURSE CO-ORDINATOR : Mr.Seelam Srinivasa Reddy, (T113), Assoc. Professor

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

COURSE OBJECTIVE(CO): The objective of this course is to get familiarize students with various trades used in Engineering Workshop such as wood working, sheet metal operations, plumbing, fitting, electrical house wiring skills, and basic repairs of two-wheeler vehicle and learn the safety precautions to be followed in the workshops, while working with the different tools.

COURSE OUTCOMES (COs)

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 trades of Tin smithy and plumbing such astapered tray, conical funnel &Pipe Threading and Layout respectively.
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 (BATCH-A1)

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 Programme	3	22-01-2025		TLM8	-	
2.	Demonstration	3	29-01-2025		TLM8	R1	
3.	Experiment-1	3	05-02-2025		TLM8	R1	
4.	Experiment-2	3	12-02-2025		TLM8	R1	
5.	Experiment-3	3	19-02-2025		TLM8	R1	
6.	Experiment-4	3	05-03-2025		TLM8	R1	
I-Mid Examinations (10-03-2025to 15-03-2025)							
7.	Experiment-5	3	19-03-2025		TLM8	R1	
8.	Experiment-6	3	26-03-2025		TLM8	R1	
9.	Experiment-7	3	02-04-2025		TLM8	R1	
10.	Experiment-8	3	09-04-2025		TLM8	R1	
11.	Experiment-9	3	16-04-2025		TLM8	R1	
12.	Experiment-10	3	23-04-2025		TLM8	R1	
13.	Practice Lab	3	30-04-2025		TLM8	R1	
14.	Repetition lab	3	07-05-2025		TLM8	R1	
15.	Repetition lab	3	14-05-2025		TLM8	R1	
16.	Lab Internal	3	21-05-2025		TLM6		
II- Mid Examinations (16-12-2024 – 21-12-2024)							

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:

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
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 (II) Semester Class Work		**30-06-2025**	

Class Time Table - B.Tech –II Sem: Artificial Intelligence & Data Science 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 Workshop		
Thursday										
Friday										
Saturday										

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: Mech

Batch No.	Reg.No.of Students	Number of Students	Batch No.	Reg.No.of Students	Number of Students
B11	24761A5401-5408	08	B21	24761A5433-5440	08
B12	24761A5409-5416	08	B22	24761A5441-5448	08
B13	24761A5417-5424	08	B23	24761A5449-5456	08
B14	24761A5425-5432	08	B24	24761A5457-5466	09

Batch No:	Exp. 01	Exp. 02	Exp. 03	Exp. 04	Exp. 05	Exp. 06	Exp. 07	Exp. 08	Exp. 09	Exp. 10
B11	C1	C2	F1	F2	P1	P2	E1	E2	S1	S2
B12	C2	C1	F2	F1	P2	P1	E2	E1	S2	S1
B13	F1	F2	C1	C2	E1	E2	S1	S2	P1	P2
B14	F2	F1	C2	C1	E2	E1	S2	S1	P2	P1
B21	C1	C2	F1	F2	P1	P2	E1	E2	S1	S2
B22	C2	C1	F2	F1	P2	P1	E2	E1	S2	S1
B23	F1	F2	C1	C2	E1	E2	S1	S2	P1	P2
B24	F2	F1	C2	C1	E2	E1	S2	S1	P2	P1

LIST OF EXPERIMENTS:

Exp. No.	Name of the Experiment	Related CO
1.	Carpentry-1(C1)-Corner Bridle Joint	CO1
2.	Carpentry-2(C2)-Dove tail Joint	CO1
3.	Fitting-1(F1)-T-**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.	Sheet Metal Working(S1)-ConicalFunnel	CO3
10.	Sheet Metal Working(S1)-Tapered tray	CO3

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)-PipeLayout	CO3
	7.	House Wiring-1(E1)–Series and Parallel Connection	CO4
	8.	House Wiring-2(E2)–Fluorescent Lamp and Calling bell Circuit	CO4
	9.	Sheet Metal Working(S1)-ConicalFunnel	CO3
	10.	Sheet Metal Working(S1)-Tapered tray	CO3

PROGRAMME EDUCATIONAL OBJECTIVES:

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

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

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

PROGRAM OUT COMES (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyses

complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Dr. P. Vijaya Kumar **Dr. A.Dhanunjay Kumar**	**S.Srinivasa Reddy**	**Mr. J. Subba Reddy**	**Dr. M. B. S Sreekara Reddy**
Course Instructors	**Course Coordinator**	**Module Coordinator**	**HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
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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 District, AP, India. 521230.
hodads@lbrce.ac.in , ads@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931
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.: 2024-25

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	24-1-2025		DM5
2.	**Week 2:** Searching and Sorting Techniques	03	31-1-2025		DM5
3.	**Week 3:** Single Linked List	03	7-2-2025		DM5
4.	**Week 4:** Double Linked List	03	14-2-2025		DM5
5.	**Week 5:** Circular Linked List	03	21-2-2025		DM5
6.	**Week 6:** Polynomial Representation & Polynomial Addition	03	28-2-2025		DM5
7.	**Week 7:** Linked List Applications	03	7-3-2025		DM5
8.	**Week 8:** Stack Implementation	03	21-3-2025		DM5
9.	**Week 9:** Stack Applications	03	28-3-2025		DM5
10.	**Week 10:** Queue Implementation & Circular Queue	03	4-4-2025		DM5
11.	**Week 11:** Double Ended Queue	03	11-4-2025		DM5
12.	**Week 12:** Trees, Hashing	03	25-4-2025 & 2-5-2025		DM5
13.	Revision of All Weeks	03	9-5-2025		DM5
14.	Lab Internal	03	16-5-2025		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.
PO8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a 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**	**Mr. S. Siva Ramakrishna**	**Dr. O. Rama Devi**
Signature				