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

COURSE HANDOUT

Part-A

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

ACADEMIC YEAR : 2024-2025

COURSE NAME & CODE : ENGINEERING PHYSICS LAB

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

COURSE CREDITS : 1

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

COURSE COORDINATOR : **Dr S Yusub**

Course Objectives:

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

Course Outcomes:

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

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

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

CO2.	**3**	**3**	**2**	**1**				**1**	1			**1**
CO3.	**3**	**3**	**2**	**1**				**1**	1			**1**
CO4.	**3**	**3**	**2**	**1**				**1**	1			**1**
CO5.	**3**	**3**	**2**	**1**				**1**	**1**			**1**
1 = slight (Low)			**2 = Moderate (Medium)**					**3 = Substantial (High)**				

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

BOS APPROVED TEXT BOOKS:
1. Lab Manual Prepared by the LBRCE.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section- AI&DS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	3	24-01-2025		**TLM4**	
2.	Demonstration	3	31-01-2025		**TLM4**	
3.	Experiment 1		07-02-2025		**TLM4**	
4.	Experiment 2	3	14-02-2025		**TLM4**	
5.	Experiment 3	3	21-02-2025		**TLM4**	
6.	Experiment 4	3	28-02-2025		**TLM4**	
7.	Experiment 5	3	07-03-2025		**TLM4**	
8.	MID -1	3	14-03-2025		**TLM4**	
9.	Demonstration	3	21-03-2025		**TLM4**	
10.	Experiment 6	3	28-03-2025		**TLM4**	
11.	Experiment 7	3	04-04-2025		**TLM4**	
12.	Experiment 8	3	11-04-2025		**TLM4**	
13.	Experiment 9	3	18-04-2025		**TLM4**	
14.	Experiment 10	3	25-04-2025		**TLM4**	
15.	**Internal Exam**	3	02-05-2025		**TLM4**	
16.	**Internal Exam**	3	09-05-2025		**TLM4**	
	No. of classes required to complete Syllabus:			48		

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

EVALUATION PROCESS:

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

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

PROGRAM OUTCOMES:

Engineering Graduates will be able to:

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

(2). **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

(3). **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

(4). **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

(5). **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

(6). **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
(7).**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
(8). **Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
(9). **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
(10). **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
(11). **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
(12).**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

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

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

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FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

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

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

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

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

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

ENGINEERING PHYSICS												
COURSE DESIGNED BY	**FRESHMAN ENGINEERING DEPARTMENT**											
Course Outcomes	**Programme Outcomes**											
PO's →	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1.	**3**	**3**	**2**	**1**	**1**	**1**	**1**	**-**	**-**	**-**	**-**	**1**
CO2.	**3**	**3**	**2**	**1**	**1**	**1**	**1**	**-**	**-**	**-**	**-**	**1**
CO3.	**3**	**3**	**2**	**1**	**1**	**1**		**-**	**-**	**-**	**-**	**1**
CO4.	**3**	**3**	**2**	**1**	**1**	**1**	**1**	**-**	**-**	**-**	**-**	**1**
CO5.	**3**	**3**	**2**	**1**	**1**	**1**	**1**	**-**	**-**	**-**	**-**	**1**
1 = slight (Low)			**2 = Moderate (Medium)**					**3 = Substantial (High)**				

BOS APPROVED TEXT BOOKS:

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

BOS APPROVED REFERENCE BOOKS:

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

WEB REFERENCES AND E-TEXT BOOKS

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: WAVE OPTICS

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Introduction to the Subject, Course Outcomes	1	20/01/2025		**TLM2**		
2.	Superposition of Coherence, Conditions for Interference	1	21/01/2025		**TLM1**		
3.	Interference from thin films	1	22/01/2025		**TLM1**		
4.	Newton's rings	1	24/01/2025		**TLM2**		
5.	Colours in thin films Applications		27/01/2025				

6.	Introduction – Diffraction, Types	1	28/01/2025		**TLM1**		
7.	Single slit diffraction	1	29/01/2025		**TLM2**		
8.	Double slit	1	31/01/2025				
9.	**N Slits**	1	03/02/2025		**TLM4**		
10.	**Diffraction grating**	1	04/02/2025		**TLM4**		
11.	TUTORIAL	1	05/02/2025		**TLM3**		
12.	Dispersive power & Resolving power of Grating	1	07/02/2025		**TLM3**		
13.	Polarization introduction	1	10/02/2025		**TLM1**		
14.	Polarization by reflection, refraction	1	11/02/2025		**TLM1**		
15.	Double refraction,	1	12/02/2025		**TLM1**		
16.	Nicol's prism	1	14/02/2025		**TLM1**		
17.	Half wave and quarter wave plate	1	17/02/2025		**TLM2**		
18.	problems	1	18/02/2025		**TLM1**		
No. of classes required to complete UNIT-I: 17				No. of classes taken:			

UNIT-II: CRYSTALLOGRAPHY AND X RAY DIFFRACTION

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Crystallography Basic defnitions	1	19/02/2025		**TLM2**		
2.	Crystal systems	1	21/02/2025		**TLM1**		
3.	Bravais Lattices		24/02/2025		**TLM1**		
4.	Packing fraction of SC	1	25/02/2025		**TLM1**		
5.	BCC, FCC	1	28/03/2025		**TLM1**		
6.	Miller Indices, separation between (hkl) planes	1	03/03/2025		**TLM1**		
7.	Bragg's law	1	04/03/2025		**TLM2**		

8.	X-ray Diffractometer	1	05/03/2025		**TLM1**		
9.	Laue's method powder method	1	07/03/2025		**TLM1**		
10.	Mid 1	1	10/03/2025				
11.	Mid 1	1	11/03/2025				
12.	Mid 1	1	12/03/2025				
No. of classes required to complete UNIT-II: 09				No. of classes taken:			

UNIT-III: DIELECTRIC AND MAGNETIC MATERIALS

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Basic Definitions Relation between electric vectors	1	17/03/2025		**TLM1**		
2.	Electronic polarization	1	18/03/2025		**TLM1**		
3.	Ionic & Orientation polarization	1	19/03/2025		**TLM1**		
4.	Local field,	1	21/03/2025		**TLM1**		
5	Clausius Mosotti equation, complex dielectric constant	1	24/03/2025		**TLM2**		
6	Frequency dependence of polarization Dielectric loss and problems	1	25/03/2025		**TLM1**		
7	Introduction to Magnetic parameters origin of magnetic moment	1	26/03/2025		**TLM1**		
8	Classification of magnetic materials – Dia, para & Ferro	1	28/03/2025		**TLM1**		
9	Classification of magnetic materials – Dia, para & Ferro Anti ferro and ferri	1	31/03/2025		**TLM2**		
10	Domain concept of ferromagnetismand domain walls	1	01/04/2025		**TLM2**		
11	Hysteresis curve	1	02/04/2025		**TLM1**		

12	soft and hard magnetic materials	1	04/04/2025		**TLM1**		
No. of classes required to complete UNIT-III: 12				No. of classes taken:			

UNIT-IV QUANTUM MECHANICS & FREE ELECTRON THEORY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Introduction quantum mechanics, DeBroglie hypothesis	1	07/04/2025		**TLM1**		
2.	Heisenberg uncertainty principle , Physical significance of wave function	1	08/04/2025		**TLM1**		
3.	Schrodinger time dependent & independent wave equations	1	09/04/2025		**TLM1**		
4.	Particle in a box	1	11/04/2025		**TLM1**		
5.	Classical free electron theory-postulates, Success & Failures	1	15/04/2025		**TLM2**		
6.	Quantum free electron theory, electrical conductivity	1	16/04/2025		**TLM1**		
7.	Tutorial	**1**	21/04/2025		**TLM3**		
8.	Fermi-Dirac distribution function-Temperature dependence	**1**	22/04/2025		**TLM2**		
9.	Density of states Fermi energy	**1**	23/04/2025		**TLM2**		
No. of classes required to complete UNIT-IV: 09				No. of classes taken:			

UNIT-V :SEMICONDUCTOR PHYSICS

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Introduction -	1	25/04/2025		**TLM1**		
2.	Classification of semiconductors	1	28/04/2025		**TLM1**		
3.	Density of Intrinsic and semiconductors Electrons,	1	29/04/2025		**TLM1**		
4.	Holes	1	30/04/2025		**TLM1**		
5.	Density of Intrinsic and semiconductors Holes	1	02/05/2025		**TLM1**		
6.	Electrical conductivity and fermi level	1	05/05/2025		**TLM1**		
7.	Density of Extrinsic semiconductors P-Type	1	06/05/2025		**TLM1**		
8.	Tutorial	1	07/05/2025		**TLM2**		
9.	Density of Extrinsic semiconductors N Type	1	09/05/2025		**TLM1**		
10.	Drift and diffusion currents Einstein equation	1	12/05/2025		**TLM2**		
11.	Hall effect and applications	1	13/05/2025		**TLM1**		
12.	Problems	1	14/05/2025		**TLM1**		
13.	Revision	1	16/05/2025				
No. of classes required to complete UNIT-V: 10				No. of classes taken:			

PART-C

EVALUATION PROCESS (R-20 Regulation):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I, II)	M-1=18
I-Quiz Examination (Units-I, II)	Q1=07

Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III , IV & V)	M-2=18
II-Quiz Examination (Units-III, IV & V)	Q2=07
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M-1,M-2)+25% of Min(M-1,M-2)	M=18
Quiz Marks =75% of Max(Q-1,Q-2)+25% of Min(Q-1,Q-2)	Q=07
Cumulative Internal Examination (CIE): A+M+Q	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	**100**

PART-D

PROGRAMME OUTCOMES (POs):

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

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

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

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L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
Phone: 08659-222933, Fax: 08659-222931

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:** I B. Tech., II-Sem., IT-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. M.Srinivasa Reddy
COURSE COORDINATOR	**:** Dr. K.R.Kavitha
PRE-REQUISITES	**:** Basics of Vectors**,** Differentiation, Integration

COURSE EDUCATIONAL OBJECTIVES (CEOs):

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

COURSE OUTCOMES (COs)

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

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

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

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

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

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

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

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

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

BOS APPROVED TEXT BOOKS:

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

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

BOS APPROVED REFERENCE BOOKS:

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

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

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

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

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

Part-B

COURSE DELIVERY PLAN (LESSON PLAN):

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

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
3.	Introduction to UNIT I	1	23-01-2025		TLM1	CO1	T1,T2	
4.	Linear Differential equation	1	24-01-2025		TLM1	CO1	T1,T2	
5.	Bernoulli's DE	1	25-01-2025		TLM1	CO1	T1,T2	
6.	Exact DE	1	27-01-2025		TLM1	CO1	T1,T2	
7.	Exact DE	1	29-01-2025		TLM1	CO1	T1,T2	
8.	Non-exact DE Type I	1	30-01-2025		TLM1	CO1	T1,T2	
9.	Non-exact DE Type II	1	31-01-2025		TLM1	CO1	T1,T2	
10.	Tutorial-1	1	01-02-2025		TLM3	CO1	T1,T2	
11.	Non-exact DE Type III	1	03-02-2025		TLM1	CO1	T1,T2	
12.	Non-exact DE Type IV	1	05-02-2025		TLM1	CO1	T1,T2	
13.	Newton's Law of cooling	1	06-02-2025		TLM1	CO1	T1,T2	
14.	Law of natural growth and decay	1	07-02-2025		TLM1	CO1	T1,T2	
15.	Tutorial-2	1	08-02-2025		TLM3	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	12-02-2025		TLM1	CO1	T1,T2	
18.	Solving a homogeneous DE	1	13-02-2025		TLM1	CO1	T1,T2	
19.	Finding Particular Integral, P.I for e^{ax+b}	1	14-02-2025		TLM1	CO1	T1,T2	
20.	Tutorial-3	1	15-02-2025		TLM3	CO1	T1,T2	
21.	P.I for Cos bx, or sin bx	1	17-02-2025		TLM1	CO1	T1,T2	
22.	P.I for polynomial function	1	19-02-2025		TLM1	CO1	T1,T2	
23.	P.I for $e^{ax+b}v(x)$	1	20-02-2025		TLM1	CO1	T1,T2	
24.	P.I for $x^k v(x)$	1	21-02-2025		TLM1	CO1	T1,T2	

25.	Tutorial-4	1	22-02-2025		TLM1	CO1	T1,T2	
26.	Method of Variation of parameters	1	24-02-2025		TLM1	CO1	T1,T2	
27.	Simultaneous linear equations	1	27-02-2025		TLM1	CO1	T1,T2	
28.	Simultaneous linear equations	1	28-03-2025		TLM1	CO1	T1,T2	
29.	Tutorial-5	1	01-03-2025		TLM3	CO1	T1,T2	
30.	L-C-R circuits	1	03-03-2025		TLM1	CO1	T1,T2	
31.	Simple Harmonic motion	1	06-03-2025		TLM1	CO1	T1,T2	
32.	Problems on SHM	1	07-03-2025		TLM1	CO1	T1,T2	
33.	Tutorial-6	1	08-03-2025		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-II		17			No. of classes taken:			

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

UNIT-III: Partial Differential Equations

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
34.	Introduction to Unit III	1	17-03-2025		TLM1	CO2	T1,T2	
35.	Formation of PDE by elimination of arbitrary constants	1	19-03-2025		TLM1	CO2	T1,T2	
36.	Formation of PDE by elimination of arbitrary functions	1	20-03-2025		TLM1	CO2	T1,T2	
37.	Formation of PDE by elimination of arbitrary functions	1	21-03-2025		TLM1	CO2	T1,T2	
38.	Tutorial-7	1	22-03-2025		TLM3	CO2	T1,T2	
39.	Solving of PDE	1	24-03-2025		TLM1	CO2	T1,T2	
40.	Lagrange's Method	1	26-03-2025		TLM1	CO2	T1,T2	
41.	Lagrange's Method	1	27-03-2025		TLM1	CO2	T1,T2	
42.	Homogeneous Linear PDE with constant coefficients	1	28-03-2025		TLM1	CO2	T1,T2	
No. of classes required to complete UNIT-III		09			No. of classes taken:			

UNIT-IV: Vector Differentiation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
43.	Introduction to UNIT IV	1	29-03-2025		TLM1	CO3	T1,T2	
44.	Vector Differentiation	1	02-04-2025		TLM1	CO3	T1,T2	
45.	Directional Derivative	1	03-04-2025		TLM1	CO3	T1,T2	

46.	Problems on Directional Derivative	1	04-04-2025		TLM1	CO3	T1,T2	
47.	Divergence	1	07-04-2025		TLM1	CO3	T1,T2	
48.	Curl	1	09-04-2025		TLM1	CO3	T1,T2	
49.	Solenoidal fields, Irrotational fields, potential surfaces	1	10-04-2025		TLM1	CO3	T1,T2	
50.	Problems on scalar potential functions	1	11-04-2025		TLM1	CO3	T1,T2	
51.	Tutorial-8	1	12-04-2025		TLM3	CO3	T1,T2	
52.	Vector Identities	1	16-04-2025		TLM1	CO3	T1,T2	
53.	Problems on Identities	1	17-04-2025		TLM1	CO3	T1,T2	
54.	Tutorial-9	1	19-04-2025		TLM3	CO3	T1,T2	
55.	Problems on Identities	1	21-04-2025		TLM1	CO3	T1,T2	
No. of classes required to complete UNIT-IV		13			No. of classes taken:			

UNIT-V: Vector Integration

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
56	Introduction to Unit-V	1	23-04-2025		TLM1	CO4	T1,T2	
57.	Line Integral	1	24-04-2025		TLM1	CO4	T1,T2	
58.	Work done	1	25-04-2025		TLM1	CO4	T1,T2	
59.	Tutorial-10	1	26-04-2025		TLM3	CO4	T1,T2	
60.	Circulation	1	28-04-2025		TLM1	CO4	T1,T2	
61.	Surface Integral	1	30-04-2025		TLM1	CO4	T1,T2	
62.	Surface Integral	1	30-04-2025		TLM1	CO4	T1,T2	
63.	Volume Integral	1	01-05-2025		TLM1	CO4	T1,T2	
64.	Green's Theorem	1	02-05-2025		TLM1	CO4	T1,T2	
65.	Tutorial-11	1	03-05-2025		TLM3	CO4	T1,T2	
66.	Problems on GT	1	05-05-2025		TLM1	CO4	T1,T2	
67.	Stoke's Thoerem	1	07-05-2025		TLM1	CO4	T1,T2	
68.	Divergence Theorem	1	08-05-2025		TLM1	CO4	T1,T2	
69.	Problems on Divergence theorem	1	09-05-2025		TLM1	CO4	T1,T2	
70.	Tutorial-12	1	10-05-2025		TLM3	CO4	T1,T2	
71.	Revision on Unit-3	1	12-05-2025		TLM1	CO4	T1,T2	
72.	Revision on Unit-4	1	14-05-2025		TLM1	CO4	T1,T2	
73.	Revision on Unit-5	1	15-05-2025		TLM1	CO4	T1,T2	
74.	Revision on Unit-5	1	16-05-2025		TLM1	CO4	T1,T2	
No. of classes required to complete UNIT-V		19			No. of classes taken:			

Content beyond the Syllabus

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

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

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

PART-CEVALUATION PROCESS (R23 Regulation):

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

PART-D PROGRAMME OUTCOMES (POs):

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

	independent and life-long learning in the broadest context of technological change.

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

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

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

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

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

DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. T. Satyanarayana

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

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

Program/Sem./Sec. : B.Tech/II/IT - 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 and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.
2. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
3. Santiram Kal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
4. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education, 2009.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): IT- 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	23-01-2025		TLM1	
3.	Characteristics of PN Junction Diode	1	24-01-2025		TLM1	
4.	Zener Effect — Zener Diode and its Characteristics	1	25-01-2025		TLM1	
5.	Zener Effect — Zener Diode and its Characteristics	1	28-01-2025		TLM1	
6.	Bipolar Junction Transistor	1	30-01-2025		TLM1	
7.	Bipolar Junction Transistor	1	31-01-2025		TLM1	
8.	CB Configurations and Characteristics	1	01-02-2025		TLM2	
9.	CE,CC Configurations and Characteristics.	1	04-02-2025		TLM2	
10.	Elementary Treatment of Small Signal CE Amplifier.	1	06-02-2025		TLM1	
No. of classes required to complete UNIT-I: 10				**No. of classes taken:**		

UNIT-II: BASIC ELECTRONIC CIRCUITS AND INSTRUMENTATION

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	**Rectifiers and power supplies**: Block diagram description of a DC power supply	1	07-02-2025		TLM1	
12.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	11-02-2025		TLM1	
13.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	13-02-2025		TLM1	
14.	Working of simple Zener voltage regulator.	1	14-02-2025		TLM1	
15.	**Amplifiers**: Block diagram of Public Address system	1	15-02-2025		TLM2	
16.	Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response.	1	18-02-2025		TLM2	
17.	**Electronic Instrumentation:** Block diagram of an electronic instrumentation system.	1	20-02-2025		TLM2	
No. of classes required to complete UNIT-II: 07				**No. of classes taken:**		

UNIT-III: DIGITAL ELECTRONICS

Sl.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Overview of Number Systems	1	21-02-2025		TLM1	
19.	Logic gates including Universal Gates,	1	22-02-2025		TLM2	
20.	BCD codes, Excess-3 code, gray code	1	25-02-2025		TLM1	
21.	Hamming code	1	27-02-2025		TLM2	
22.	Boolean Algebra, Basic Theorems and properties of Boolean Algebra	1	28-02-2025		TLM2	
23.	Simple combinational circuits	1	01-03-2025		TLM1	
24.	Half and Full Adders,	1	04-03-2025		TLM1	
25.	Introduction to sequential circuits, Flip flops,	1	06-03-2025		TLM2	
26.	Registers and counters	1	07-03-2025		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 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
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PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Date: 11-01-2025

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

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Mrs.D.Vijaya Sri

Course Name & Code : DATA STRUCTURES LAB & 23CS52

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

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

PREREQUISITE: Programming for Problem Solving Using C

COURSE EDUCATIONAL OBJECTIVE:

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

COURSE OUTCOMES (CO):

CO1: Apply Linear Data Structures for organizing the data efficiently **(Apply-L3)**

CO2: Apply Non- Linear Data Structures for organizing the data efficiently **(Apply-L3)**

CO3: Develop and implement hashing techniques for solving problems (**Apply - L3**)

CO4: Improve individual / teamwork skills, communication & report writing skills withethical values.

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

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	3								3		
CO2	3	2	2	1	3								3		
CO3	3	2	2	1	3								3		
CO4								2	2	2	2	2			

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

PART-B:

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign
1.	Array Manipulations	3	22-01-25		
2.	Searching and Sorting Techniques	3	29-01-25		
3.	Single Linked List	3	05-02-25		
4.	Double Linked List	3	12-02-25		
5.	Circular Linked List	3	19-02-25		
6.	Polynomial Representation & Polynomial Addition	3	05-03-25		
7.	Linked List Applications	3	19-03-25		
8.	Stack Implementation	3	26-03-25		
9.	Stack Applications	3	02-04-25		
10.	Queue Implementation & Circular Queue	3	09-04-25		
11.	Double Ended Queue	3	16-04-25		
12.	Trees	3	23-04-25 30-04-25		
13.	Hashing	3	07-05-25		
14.	Internal Exam	3	14-05-25		

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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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	Organize, Analyze and Interpret the data to extract meaningful conclusions
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

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

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Mrs.J.GEETHA RENUKA

Course Name & Code : DATA STRUCTURES LAB & 23CS52

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

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

PREREQUISITE: Programming for Problem Solving Using C

COURSE EDUCATIONAL OBJECTIVE:

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

COURSE OUTCOMES (CO):

CO1: Apply Linear Data Structures for organizing the data efficiently **(Apply-L3)**

CO2: Apply Non- Linear Data Structures for organizing the data efficiently **(Apply-L3)**

CO3: Develop and implement hashing techniques for solving problems (**Apply - L3**)

CO4: Improve individual / teamwork skills, communication & report writing skills withethical values.

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

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	3								3		
CO2	3	2	2	1	3								3		
CO3	3	2	2	1	3								3		
CO4								2	2	2	2	2			

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

PART-B:

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign
1.	Array Manipulations	3	20-01-25		
2.	Searching and Sorting Techniques	3	27-01-25		
3.	Single Linked List	3	03-02-25		
4.	Double Linked List	3	10-02-25		
5.	Circular Linked List	3	17-02-25		
6.	Polynomial Representation & Polynomial Addition	3	24-03-25		
7.	Linked List Applications	3	10-03-25		
8.	Stack Implementation	3	17-03-25		
9.	Stack Applications	3	24-03-25		
10.	Queu e Implementation &Circular Queue	3	07-04-25		
11.	Double Ended Queue	3	21-04-25		
12.	Trees	3	28-04-25		
13.	Hashing	3	05-05-25		
14.	Internal Exam	3	12-05-25		

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

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

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Mrs.D.Vijaya Sri
Course Name & Code : DATA STRUCTURES & 23CS02
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/IT/II /A **A.Y.:** 2024-25

PREREQUISITE : Programming for Problem Solving Using C-20CS01

COURSE EDUCATIONAL OBJECTIVES(CEO):

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

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

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

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

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

TEXTBOOKS:

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

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

REFERENCE BOOKS:

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

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

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

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Linear Data Structures

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction and Discussion of CO's	1	20-01-25		TLM1	
2.	Definition and Importance of LinearData Structures	1	21-01-25		TLM1	
3.	Abstract Data Typesand Implementation	1	22-01-25		TLM1	
4.	Overview of time and space complexity	1	23-01-25		TLM1	
5.	Analysis of Liner Datastructures	1	27-01-25		TLM1	
6.	Revise Arrays	1	28-01-25		TLM 1	
7.	Searching Techniques: LinearSearch	1	29-01-25		TLM 1 & 4	
8.	Binary Search & Analysis	1	30-01-25		TLM 1 & 4	
9.	Bubble Sort &Analysis	1	03-02-25		TLM 1 & 4	
10.	Insertion Sort & Analysis	1	04-02-25		TLM 1 & 4	
11.	Selection Sort &Analysis	1	05-02-25		TLM 1 & 4	
12.	Tutorial	1	06-02-25		TLM3	
13.	Revision & Assignment	1	10-02-25		TLM2	
No. of classes required to complete UNIT-I: 13				**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
14.	List Implementation using Arrays and Array Disadvantages	1	11-02-25		TLM 1 & 4	
15.	Linked List Representation	1	12-02-25		TLM 1	
16.	Sing Linked List : Operations	3	13-02-25 17-02-25 18-02-25		TLM 1 & 4	
17.	Double Linked List : Operations	2	19-02-25 20-02-25		TLM 1 & 4	
18.	Circular Single Linked List	1	24-02-25		TLM1	
19.	Circular Double Linked List	2	25-02-25 27-02-25		TLM 1& 4	
20.	Comparing Arrays and Linked List	1	3-03-25		TLM1	
21.	Applications of Linked Lists: Polynomial Representation	1	4-03-25		TLM1	
22.	Polynomial Addition	1	5-03-25		TLM 1&4	
23.	Tutorial	1	6-03-25		TLM3	
24.	Revision & Assignment	1	6-03-25		TLM2	
No. of classes required to complete UNIT-II: 14				**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
25.	Introduction to Stacks : Properties	1	17-03-25		TLM 1	
26.	Operations of Stacks	1	18-03-25		TLM 1	
27.	Implementation of stacks using arrays	1	19-03-25		TLM 1 & 4	
28.	Stacks using Linked List	1	20-03-25		TLM 1 & 4	
29.	Expressions: Expression evaluation	2	24-03-25 25-03-25		TLM1	
30.	Infix to Postfix Conversion	2	26-03-25 27-03-25		TLM1	
31.	Checking Balanced Parenthesis	2	01-04-25 02-04-25		TLM1	
32.	Reversing a List	1	03-04-25		TLM1	
33.	Backtracking	1	07-04-25		TLM1	
34.	Tutorial	1	08-04-25		TLM3	
35.	Revision & Assignment	1	09-04-25		TLM2	
No. of classes required to complete UNIT-III: 14				**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
36.	Introduction to queues: properties and operations,	1	10-04-25		TLM1	
37.	Implementing queues using arrays	1	15-04-25		TLM 1 & 4	
38.	Implementing queues using Linked List	1	16-04-25		TLM 1 & 4	
39.	Applications of Queue: Scheduling	1	17-04-25		TLM 1	
40.	Breadth First Search	1	21-04-25		TLM 1 & 4	
41.	Circular Queue	1	22-04-25		TLM 1& 4	
42.	Double ended queue	1	23-04-25		TLM 1	
43.	Applications of Deque	1	24-04-25		TLM 1	
44.	Revision & Assignment	1	28-04-25		TLM 2	

No. of classes required to complete UNIT-IV: 09	No. of classes taken:

UNIT-V: TREES & HASHING TECHNQIUES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Introduction to Trees,	1	29-04-25		TLM 1	
46.	Representation of Trees	1	30-04-25		TLM 1	
47.	Tree Traversals	1	01-05-25		TLM 1 & 4	
48.	Binary Search Trees-Operations	2	05-05-25 06-05-25		TLM 1& 4	
49.	Hashing Introduction, Hash Functions	1	07-05-25		TLM 1	
50.	Collison Resolution Techniques: Separate Chaining	1	08-05-25		TLM 1	
51.	Open Addressing: Linear Probing	1	12-05-25		TLM 1	
52.	Quadratic Probing, Double Hashing	1	13-05-25		TLM 1	
53.	Rehashing	1	14-05-25		TLM 1	
54.	Applications of Hashing	1	15-05-25		TLM 1	
55.	Revision & Assignment	1	15-05-25		TLM2	
No. of classes required to complete UNIT-V: 11				**No. of classes taken:**		

Content Beyond Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Evaluation of Prefix Expression	1			**TLM 1 & 4**	CO5	
2.	Towers of Hanoi	1			**TLM 1 & 4**	CO5	
3.	Extendable Hashing	1			**TLM 1**		

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):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

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

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Mrs.J.GEETHA RENUKA
Course Name & Code : DATA STRUCTURES & 23CS02
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/IT/II /B **A.Y.:** 2024-25

PREREQUISITE : Programming for Problem Solving Using C-20CS01

COURSE EDUCATIONAL OBJECTIVES(CEO):

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

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

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

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

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

TEXTBOOKS:

T1 Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
T2 Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan AndersonFreed, Silicon Press, 2008

REFERENCE BOOKS:

R1 Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
R2 C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
R3 Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
R4 Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
R5 Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Linear Data Structures

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction and Discussion of CO's	1	20-01-25		TLM1	
2.	Definition and Importance of LinearData Structures	1	21-01-25		TLM1	
3.	Abstract Data Typesand Implementation	1	22-01-25		TLM1	
4.	Overview of time and space complexity	1	25-01-25		TLM1	
5.	Analysis of Liner Datastructures	1	27-01-25		TLM1	
6.	Revise Arrays	1	28-01-25		TLM 1	
7.	Searching Techniques: LinearSearch	1	29-01-25		TLM 1 & 4	
8.	Binary Search & Analysis	1	01-02-25		TLM 1 & 4	
9.	Bubble Sort &Analysis	1	03-02-25		TLM 1 & 4	
10.	Insertion Sort & Analysis	1	04-02-25		TLM 1 & 4	
11.	Selection Sort &Analysis	1	05-02-25		TLM 1 & 4	
12.	Tutorial	1	08-02-25		TLM3	
13.	Revision & Assignment	1	10-02-25		TLM2	
No. of classes required to complete UNIT-I: 13				**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
14.	List Implementation using Arrays and Array Disadvantages	1	11-02-25		TLM 1 & 4	
15.	Linked List Representation	1	12-02-25		TLM 1	
16.	Sing Linked List : Operations	3	15-02-25 17-02-25 18-02-25		TLM 1 & 4	
17.	Double Linked List : Operations	2	19-02-25 22-02-25		TLM 1 & 4	
18.	Circular Single Linked List	1	24-02-25		TLM1	
19.	Circular Double Linked List	2	25-02-25 01-03-25		TLM 1& 4	
20.	Comparing Arrays and Linked List	1	3-03-25		TLM1	
21.	Applications of Linked Lists: Polynomial Representation	1	4-03-25		TLM1	
22.	Polynomial Addition	1	5-03-25		TLM 1&4	
23.	Tutorial	1	8-03-25		TLM3	
24.	Revision & Assignment	1	8-03-25		TLM2	
No. of classes required to complete UNIT-II: 15				**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
25.	Introduction to Stacks : Properties	1	17-03-25		TLM 1	
26.	Operations of Stacks	1	18-03-25		TLM 1	
27.	Implementation of stacks using arrays	1	19-03-25		TLM 1 & 4	
28.	Stacks using Linked List	1	22-03-25		TLM 1 & 4	
29.	Expressions: Expressio n evaluatio n	2	24-03-25 25-03-25		TLM1	
30.	Infix to Postfix Conversion	2	26-03-25 29-03-25		TLM1	
31.	Checking Balanced Parenthesis	2	01-04-25 02-04-25		TLM1	
32.	Reversing a List	1	07-04-25		TLM1	
33.	Backtracking	1	08-04-25		TLM1	
34.	Tutorial	1	09-04-25		TLM3	
35.	Revision & Assignment	1	09-04-25		TLM2	
No. of classes required to complete UNIT-III: 14				**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
36.	Introduction to queues: properties and operations,	1	12-04-25		TLM1	
37.	Implementing queues using arrays	1	15-04-25		TLM 1 & 4	
38.	Implementing queues using Linked List	1	16-04-25		TLM 1 & 4	
39.	Applications of Queue: Scheduling	1	19-04-25		TLM 1	
40.	Breadth First Search	1	21-04-25		TLM 1 & 4	
41.	Circular Queue	1	22-04-25		TLM 1& 4	
42.	Double ended queue	1	23-04-25		TLM 1	
43.	Applications of Deque	1	26-04-25		TLM 1	

44.	Revision & Assignment	1	28-04-25		**TLM 2**	
No. of classes required to complete UNIT-IV: 09				**No. of classes taken:**		

UNIT-V: TREES & HASHING TECHNQIUES

S. No.	**Topics to be covered**	**No. of Classes Required**	**Tentative Date of Completion**	**Actual Date of Completion**	**Teaching Learning Methods**	**HOD Sign Weekly**
45.	Introduction to Trees,	1	29-04-25		**TLM 1**	
46.	Representation of Trees	1	30-04-25		**TLM 1**	
47.	Tree Traversals	1	03-05-25		**TLM 1 & 4**	
48.	Binary Search Trees- Operations	2	05-05-25 06-05-25		**TLM 1& 4**	
49.	Hashing Introduction, Hash Functions	1	07-05-25		**TLM 1**	
50.	Collison Resolution Techniques: Separate Chaining	1	10-05-25		**TLM 1**	
51.	Open Addressing: Linear Probing	1	12-05-25		**TLM 1**	
52.	Quadratic Probing, Double Hashing	1	13-05-25		**TLM 1**	
53.	Rehashing	1	14-05-25		**TLM 1**	
54.	Applications of Hashing	1	17-05-25		**TLM 1**	
55.	Revision & Assignment	1	17-05-25		**TLM2**	
No. of classes required to complete UNIT-V: 11				**No. of classes taken:**		

Content Beyond Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Evaluation of Prefix Expression	1			**TLM 1 & 4**	CO5	
2.	Towers of Hanoi	1			**TLM 1 & 4**	CO5	
3.	Extendable Hashing	1			**TLM 1**		

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):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

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

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

COURSE HANDOUT

PART-A

Name of Course Instructor: P. Mohanaganga Raju, K. Harish Kumar

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

PREREQUISITE: Nil

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

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

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

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

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

Textbooks:

T1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published,2019. Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.

T2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co., 2015 & 2017.

Reference Books:

R1. LBRCE Workshop Lab Manual.

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

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

Si.No.	Topics to be covered (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	CYCLE-I					
1.	Introduction to Lab	3	21-01-2025		TLM4	
2.	Dove Tail Joint	3	28-01-2025		TLM4	
3.	Corner Lap Joint	3	04-02-2025		TLM4	
4.	T-Fitting	3	11-02-2025		TLM4	
5.	V-Fitting	3	18-02-2025		TLM4	
6.	Two Laps in Series and Parallel Connection with One Way Switch	3	25-02-2025		TLM4	
7.	Florescent Lamp and Calling Bell Circuit	3	04-03-2025		TLM4	
	CYCLE-II					
8.	Preparation of Pipe Layout	3	18-03-2025		TLM4	
9.	Pipe Threading	3	25-03-2025		TLM4	
10.	Preparation of Rectangular Tray	3	01-04-2025		TLM4	
11.	Preparation of Open Scoop	3	08-04-2025		TLM4	
12.	Preparation Of S-Hook	3	15-04-2025		TLM4	
13.	Preparation of chisel,	3	22-04-2025		TLM4	
14.	Repetition	3	29-04-2025		TLM4	
15.	Repetition	3	06-05-2025		TLM4	
16.	Internal Lab Exam	3	13-05-2025		-----	
No. of classes required to complete				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

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

PROGRAMME OUTCOMES (POs):

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

PO 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

	Course Instructor	**Head of the Department**
Signature		
Name of the Faculty	P. Mohanaganga Raju	Dr. J V RAO

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DEPARTMENT OF ECE

LAB HANDOUT

PART-A

Name of Course Instructor : Dr. A.Narendra Babu, Mrs.B.Rajeswari, Dr.T.Satyanarayana, Mr.P.James Vijay

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

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

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

PREREQUISITE: NIL

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

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

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

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

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): B.Tech. IT- II Sem-Sec B

S.No.	Topics to be covered. (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to BEEE Lab (Function Generators, CRO, RPS, Breadboard etc), Course Objectives and Outcomes.	3	23-01-2025		TLM4	
2.	Plot V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.	3	30-01-2025		TLM4	
3.	Plot V – I characteristics of Zener Diode and its application as voltage Regulator	3	06-02-2025		TLM4	
4.	Implementation of half wave and full wave rectifiers	3	13-02-2025		TLM4	
5.	Plot Input & Output characteristics of BJT in CB configuration	3	20-02-2025		TLM4	
6.	Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs / Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs	3	27-02-2025		TLM4	
7.	Internal Lab Examination (**Electronics**)	3	06-03-2025		TLM4	
No. of classes required: 21				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Date: 20-01-2025

Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Dr. A.Narendra Babu	Mrs. B. Rajeswari	Dr. T. Satyanarayana	Dr. G. Srinivasulu

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DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. A.Narendra Babu

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

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

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

Regulations: R23

PREREQUISITE: Physics

Course Objectives (COs)

Basic Electrical Engineering:

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

Basic Electronics Engineering

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

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

PART-B: BASIC ELECTRONICS ENGINEERING	
CO4	Interpret the characteristics of various semiconductor devices **(Knowledge)**
CO5	Infer the operation of rectifiers, amplifiers. **(Understand)**
CO6	Contrast various logic gates, sequential and combinational logic circuits. **(Understand)**

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

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

TEXTBOOKS:

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

REFERENCE BOOKS:

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): IT-B Section

PART B: BASIC ELECTRONICS ENGINEERING

UNIT-I: Semiconductor Devices

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction – Course Outcomes	1	20-01-2025		TLM1	
2.	Evolution of electronics, Vacuum tubes to nano electronics	1	23-01-2025		TLM1	
3.	Characteristics of PN Junction Diode	1	24-01-2025		TLM1	
4.	Zener Effect — Zener Diode and its Characteristics	1	25-01-2025		TLM1	
5.	Zener Effect — Zener Diode and its Characteristics	1	27-01-2025		TLM1	
6.	Bipolar Junction Transistor	1	30-01-2025		TLM1	
7.	Bipolar Junction Transistor	1	31-01-2025		TLM1	
8.	CB Configurations and Characteristics	1	01-02-2025		TLM2	
9.	CE,CC Configurations and Characteristics.	1	03-02-2025		TLM2	
10.	Elementary Treatment of Small Signal CE Amplifier.	1	06-02-2025		TLM1	
No. of classes required to complete UNIT-I: 10				**No. of classes taken:**		

UNIT-II: Basic Electronic Circuits and Instrumentation

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	**Rectifiers and power supplies**: Block diagram description of a DC power supply	1	07-02-2025		TLM1	
12.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	08-02-2025		TLM1	
13.	Working of full wave bridge rectifier, capacitor filter (no analysis)	1	10-02-2025		TLM1	
14.	Working of simple Zener voltage regulator.	1	13-02-2025		TLM1	
15.	**Amplifiers**: Block diagram of Public Address system	1	14-02-2025		TLM2	
16.	Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response.	1	15-02-2025		TLM2	
17.	**Electronic Instrumentation:** Block diagram of an electronic instrumentation system.	1	17-02-2025		TLM2	
No. of classes required to complete UNIT-II: 07				**No. of classes taken:**		

UNIT-III: Digital Electronics

SI.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Overview of Number Systems	1	20-02-2025		TLM1	
19.	Logic gates including Universal Gates	1	21-02-2025		TLM2	
20.	BCD codes, Excess-3 code	1	22-02-2025		TLM!	
21.	Gray code, Hamming code	1	24-02-2025		TLM!	
22.	Boolean Algebra basics	1	27-03-2025		TLM1	

23.	Basic Theorems and properties of Boolean Algebra	1	28-03-2025		TLM2	
24.	Simple combinational circuits	1	01-03-2025		TLM1	
25.	Half and Full Adders	1	03-03-2025		TLM1	
26.	Introduction to sequential circuits, Flip flops,	1	06-03-2025		TLM2	
27.	Registers and counters	1	07-03-2025		TLM2	
28.	Review	1	08-03-2025		TLM1	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

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

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

PART-C

EVALUATION PROCESS (R23 Regulation):

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	13-01-2025	08-03-2025	8W
I Mid Examinations	10-03-2025	15-03-2024	1W
II Phase of Instructions	17-03-2025	17-05-2025	9W
II Mid Examinations	02-06-2025	07-06-2025	1W
Preparation and Practicals	09-06-2025	14-06-2025	1W
Semester End Examinations	16-06-2025	28-06-2025	2W

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of

	the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Date: 11-01-2025

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