LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)



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## **DEPARTMENT OF ECE**

## **COURSE HANDOUT**

## PART-A

Name of Course Instructor: Dr. G. Srinivasulu, ProfessorCourse Name & Code: EDC-20EC01L-T-P Structure: 3-0-0Program/Sem/Sec: B. Tech. I-Sem., ECE A Sec

**Regulation**: R20 **Credits:** 03 **A.Y.:** 2022-23

**PREREQUISITE:** Fundamentals of Physics

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**: This course introduces the Device construction, characteristics and applications of semiconductor devices like PN junction diode, Bipolar Junction Transistor (BJT), Field Effect Transistor (FET), Metal oxide Semiconductor Field Effect Transistor (MOSFET) and various special devices.

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

00010L	
CO1	Identify the types of Diodes, Transistors, FETs, Biasing techniques and their
	comparisons to select the best approaches for designing the electronic circuits
	using Devices and components
CO2	Interpret the mathematical models of Currents & Voltages of Diodes, Bipolar
	Junction Transistors and Field Effect Transistors and biasing of BJT and FET
	using fundamental circuits
<b>CO3</b>	Apply the knowledge of diodes, transistors and filters for designing the
	rectifiers, Filters, Regulators and Amplifier circuits using Devices and
	components
CO4	Analyze the characteristics of Diodes, Bipolar Junction Transistors, Field
	Effect Transistors and their equivalent models using VI Characteristics and
	mathematical models

P01 **PO2 PO3** P04 **PO5** P06 **P07 PO8** P09 P010 P011 P012 PS01 PSO2 PSO3 COs CO1 2 3 1 3 1 \_ 1 2 1 1 \_ \_ \_ \_ -1 **CO2** 2 1 2 1 3 1 1 -1 --\_ --2 2 **CO3** 3 1 1 1 -\_ \_ --\_ \_ \_ \_ **CO4** 1 3 1 1 2 2 \_ ---\_ -\_ \_ -2 – Medium **3 -** High 1 - Low

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

#### **TEXTBOOKS:**

- **T1** Jacob Millman, Christos C Halkias, Electronic Devices and Circuits, Third edition, Tata McGraw Hill, Publishers, New Delhi. 2012
- **T2** Boylestad R.L. and Louis Nashelsky, Electronic Devices and Circuits, Fourth edition, Pearson/Prentice Hall Publishers, 2014

#### **REFERENCE BOOKS:**

**R1** Ben Streetman and Sanjay Banerjee, Solid State Electronic Devices, Fourth edition, Prentice Hall Publishers, 2014

## PART-B

## COURSE DELIVERY PLAN (LESSON PLAN)

## **UNIT-I: PN Junction Diode**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	Introduction to course,					
1.	Course Outcomes,	1	18.10.2022			
	Introduction to UNIT-I					
2	Qualitative theory of the	1	19.10.2022			
	p-n Junction	-				
3.	Diode current equitation	1	20.10.2022			
4.	The Current components	1	21.10.2022			
	in a p-n Diode	-				
5.	The Volt- Ampere	1	22.10.2022			
	Characteristic		05 10 0000			
6.	Diode Capacitance-	1	25.10.2022			
7	Diffusion Conscitance	1	26 10 2022			
1.	Diffusion Capacitance	L	20.10.2022			
8.	Zener Diode	1	27.10.2022			
9.	Tunnel Diode	1	28.10.2022			
10.	Solar cell	1	29.10.2022			
11.	UJT	1	01.11.2022			
12.	SCR	1	02.11.2022			
13.	Assignment-I	1	03.11.2022			
No.	of classes required to c	omplete	UNIT-I: 13	No. of cla	sses take	n:

## UNIT-II: Diode Applications

e		No. of	Tentative	Actual	Teaching	HOD
No.	Topics to be covered	Classes	Date of	Date of	Learning	Sign
110.		Required	Completion	Completion	Methods	Weekly
14	Introduction to Power	1	04.11.2022			
14.	supplies	1				
15.	Full wave Rectifiers	1	05.11.2022			
10	Ripple removal using	1	09.11.2022			
16.	Capacitive	L				
17.	Inductive	1	10.11.2022			
18.	L section	1	11.11.2022			
19.	$\pi$ section filters	1	12.11.2022			
00	Voltage Regulator	1	15.11.2022			
20.	using Zener diode	1				
21.	Clippers	1	16.11.2022			
22.	Clampers	1	17.11.2022			
23.	Assignment-II	1	18.11.2022			
No.	of classes required to con	No. of cla	sses take	en:		

## UNIT-III: Bipolar Junction Transistor

S. No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completio n	Teachin g Learning Methods	HOD Sign Weekly
24.	BJT-construction	1	19.11.2022			
25.	Different regions of operations	1	22.11.2022			
26.	Transistor Current components	1	23.11.2022			
27.	Emitter Efficiency,	1	24.11.2022			

	Transport Factor, Large					
	Signal Current Gain					
	Input and Output		25.11.2022			
28.	characteristics of CB	1				
	Configuration					
	Input and Output		26.11.2022			
29.	characteristics of CE	1				
	Configuration					
	Input and Output		29.11.2022			
30.	characteristics of CC	1				
	Configuration					
21	Relation between $\alpha$ , $\beta$	1	30.11.2022			
51.	and γ	1				
32.	Ebers-Moll Model.	1	03.12.2022			
33.	Assignment-III	1	10.12.2022			
No.	of classes required to	complet	e UNIT-III: 10	No. of	classes	taken:

#### **UNIT-IV: Field Effect Transistors**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	FET Construction	1	10.12.2022			
35.	Classification of FET	1	20.12.2022			
36.	Comparison between FET and BJT	1	21.12.2022			
	Drain and Transfer		22.12.2022,			
37.	Characteristics of n- channel JFET	2	23.12.2022			
38.	Drain and Transfer Characteristics of p-JFET	1	24.12.2022			
39.	n-channel enhancement MOSFET	1	27.12.2022			
	Drain and Transfer		28.12.2022,			
40.	Characteristics nMOSFET	2	29.12.2022			
	Drain and Transfer		30.12.2022,			
41.	Characteristics of p- channel MOSFET	2	31.12.2022			
42.	MOS Capacitor	1	03.01.2023			
43.	Assignment-IV	1	04.01.2023			
No.	of classes required to c	omplete	UNIT-IV: 13	No. of cla	sses take	n:

## UNIT-V: BJT Biasing and FET Biasing

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
44.	Need for biasing; Operating Point	1	05.01.2023			
45.	DC and AC load line	1	06.01.2023			
46.	Stability factors S	1	07.01.2023			
47.	Stability factors S' and S"	1	10.01.2023			
48.	Biasing circuits- Fixed bias	1	11.01.2023			
49.	Problems on Fixed Bias	1	18.01.2023			
50.	Collector to Base Bias	1	19.01.2023			
51.	Problems on	1	20.01.2023			

	Collector to Base Bias					
52.	Self Bias	1	21.01.2023			
53.	Thermal Runaway and Thermal Stability	1	24.01.2023			
54.	Bias Compensation techniques.	2	25.01.2023, 27.01.2023			
55.	FET Voltage divider bias	1	28.01.2023			
56.	Small signal equivalent of FET	1	02.02.2023, 03.02.2023			
57.	Assignment-V	1	07.02.2023			
No.	No. of classes required to complete UNIT-V: 14			No. of classe	s taken:	

58.	Topic beyond syllabus: Realization of Level translator with transistor	1	10.02.2023		
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Teaching Learning Methods					
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)		
TLM2	РРТ	TLM5	ICT (NPTEL/Swayam Prabha/MOOCS)		
TLM3	Tutorial	TLM6	M6 Group Discussion/Project		

#### <u>PART-C</u>

## EVALUATION PROCESS (R20 Regulation):

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

# PART-D PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

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

#### **PROGRAMME OUTCOMES (POs):** Engineering knowledge: Apply the knowledge of mathematics, science, engineering PO 1 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 Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern **PO 5** engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations The engineer and society: Apply reasoning informed by the contextual knowledge to assess **PO 6** societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice Environment and sustainability: Understand the impact of the professional engineering **PO 7** 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):**

<b>PSO 1</b>	Design and develop modern communication technologies for building the inter disciplinary
	skills to meet current and future needs of industry
PSO 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
<b>PSO 3</b>	Apply the Signal processing techniques to synthesize and realize the issues related to real time
	applications

**Course Instructor Course Coordinator Module Coordinator** 

**Head of the Department** 



#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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## COURSE HANDOUT PART-A

Name of Course Instructor	: Mr. CH.Mallikharjuna Rao	
Course Name & Code	: Basic Electrical Engineering – 20EE01	
L-T-P Structure	: 3-0-0	Credits: 3
Program/Sem/Sec	: B.Tech., ECE., I-Sem., Section- A A.Y	: 2022-23

#### **PRE-REQUISITE:** Physics

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

This course deals with nature of basic electrical components, analysis of steady state and transient response of linear electrical networks. It also deals with the principle of operation of AC and DC machines.

#### **COURSE OUTCOMES (COs):** At the end of the course, students are able to

CO 1	Illustrate the behavior of active and passive components, series and parallel circuits, self and
	mutual inductance of magnetic circuits, network functions and two port networks using circuit
	and mathematical approaches. (Understand – L2)
CO 2	Interpret the working principles of AC and DC machines along with grounding and earthling
	using electrical engineering fundamentals and mathematical approaches.(Understand – L2)
CO 3	Apply mesh analysis, nodal analysis and network theorems to solve the Thevinen's voltage,
	Norton's current and maximum power transfer of the linear circuits. (Apply – L3)
<b>CO 4</b>	Analyze the concepts of bandwidth, quality factor of series and parallel resonant circuits using
	circuit and mathematical approaches.(Analyze – L4)

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

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

Correlation Levels: 1-Slight (Low), 2-Moderate (Medium), 3-Substantial (High) and No correlation: '-'

#### **TEXT BOOKS:**

- T1 Ravish R Singh, "Network Analysis and synthesis", Tata McGraw Hill Pvt Ltd, New Delhi.2013
- T2 B.L Theraja, A.K. Theraja, "Electrical Technology in S.I. UNITS. Volume II. AC & DC
- MACHINES"Published by S. Chand & Company Ltd 2016.

#### **REFERENCE BOOKS:**

- **R1** M.S Naidu and S. Kamakshaiah, "Introduction to Electrical Engineering", TMH Publication, 3<sup>rd</sup> edition 2017.
- **R2** A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7<sup>th</sup> Edition, New Delhi 2017.

## PART-B

#### COURSE DELIVERY PLAN (LESSON PLAN): Section-A UNIT-I: Electrical Circuit Fundamentals

S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Course, COs	1	17-10-2022		TLM1	
2.	Basic definitions, Types of elements- active and passive	1	19-10-2022		TLM1	
3.	Ohm's Law	1	20-10-2022		TLM1	
4.	Kirchhoff's Laws	2	22-10-2022		TLM1	
5.	Network reduction techniques- series, parallel	2	26-10-2022		TLM1	
6.	star to delta, delta to star transformations	2	28-10-2022		TLM1	
7.	source transformations	1	29-10-2022		TLM1	
8.	mesh analysis	2	02-11-2022		TLM1	
9.	nodal analysis	2	04-11-2022		TLM1	
10.	Duality and dual networks	1	05-11-2022		TLM1	
No. of	classes required to complete UNIT-I	15	No. e	of classes tak	en	

#### UNIT-II: MAGNETIC CIRCUITS & AC FUNDAMENTALS

S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Self and mutual inductance, Dot convention	1	07-11-2022		TLM1	
2.	Coefficient of coupling,	1	09-11-2022		TLM1	
3.	analysis of series and parallel magnetic circuits	1	10-11-2022		TLM1	
4.	practiceproblems	1	11-11-2022		TLM1	
5.	Coupled circuits	1	17-11-2022		TLM1	
6.	Peak, R.M.S, average and instantaneous values, Form factor	1	18-11-2022		TLM1	
7.	Peak factor, Phase and Phase difference	1	19-11-2022		TLM1	
8.	Concepts of Reactance, Impedance	1	17-11-2022		TLM1	
9.	Susceptance and Admittance	1	21-11-2022		TLM1	
10.	Real, Reactive Powers	1	23-11-2022		TLM1	
11.	Apparent Power Factor, Power Factor	1	25-11-2022		TLM1	
No. of	classes required to complete UNIT-II	11	No. c	of classes tak	en	

## **UNIT-III: : NETWORK THEOREMS & RESONANCE CIRCUITS**

S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Superposition Theorem,	2	26-11-2022		TLM1	
2.	Thevenin's Theorem,	2	30-11-2022		TLM1	
3.	Norton's Theorem,	2	02-12-2022		TLM1	
4.	Maximum power transfer theorem	2	05-12-2022		TLM1	

5.	Reciprocity Theorem	1	08-12-2022	TLM1	
6.	Milliman's Theorem	1	09-12-2022	TLM1	
7.	Series resonant circuit	2	17-12-2022	TLM1	
8.	Parallel resonant circuit	2	21-12-2022	TLM1	
9.	concept of band width, quality factor.	2	23-12-2022	TLM1	
No. of	classes required to complete UNIT-III	16	No. of classes tal	ken	

#### UNIT-IV: NETWORK FUNCTIONS & TWO PORT NETWORKS

S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Network Functions: Driving point and transfer functions,	2	26-12-2022		TLM1	
2.	Poles and zeros of network functions,. Two-Port Networks:	2	29-12-2022		TLM1	
3.	Restrictions of pole and zero locations for driving point and transfer functions	1	31-12-2022		TLM1	
4.	Z-Parameters	2	02-01-2023		TLM1	
5.	Y-Parameters	2	05-01-2023		TLM1	
6.	ABCD-Parameters	2	07-01-2023		TLM1	
7.	h-Parameters	2	11-01-2023		TLM1	
8.	Inter-relationship between parameters	2	19-01-2023		TLM1	
9.	Two port network connections in series	2	21-01-2023		TLM1	
10.	Two port network connections in parallel and cascaded.	2	25-01-2023		TLM1	
No. of	classes required to complete UNIT-IV	19	No. o	of classes tak	ken	

## UNIT-V: ELECTRICAL MACHINES

S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Electrical Machines: Types of Electrical Machines and their applications;	1	28-01-2023		TLM1	
2.	Working principle of DC machines,	2	30-01-2023		TLM1	
3.	Working principle of single phase transformer: EMF equation	2	02-02-2023		TLM1	
4.	Working principle of 3-phase induction motor, EMF equation. Electrical Safety:	2	04-02-2023		TLM1	
5.	Electrical Safety Definition, precautions.	2	08-02-2023		TLM1	
6.	Concepts of grounding and earthing.	1	10-02-2023		TLM1	
No. of	classes required to complete UNIT-V	10	No. c	of classes tak	en	

## **Contents beyond the Syllabus**

		No. of	Tentative	Actual	Teaching	HOD
S.No.	Topic/s	Classes	Date of	Date of	Learning	Sign
		Required	Completion	Completion	Methods	Weekly

1.	LCR Meter working	1	10-02-2023	TLM1	
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## **Teaching Learning Methods**

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

## PART-C

## **EVALUATION PROCESS:**

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

## PART-D

<b>PROGR</b> A	AMME 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
<b>DO</b> 4:	Considerations.
PO 4:	conduct investigations of complex problems. Use research-based knowledge and research
	information to provide valid conclusions
PO 5.	Modern tool usage: Create select and apply appropriate techniques resources and modern
100	engineering and IT tools including prediction and modelling to complex engineering activities
	with an understanding of the limitations
PO 6:	The engineer and society: Apply reasoning informed by the contextual knowledge to assess
	societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the
	professional engineering practice
PO 7:	Environment and sustainability: Understand the impact of the professional engineering
	solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for
	sustainable development.
PO 8:	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms
	of the engineering practice.
PO 9:	Individual and team work: Function effectively as an individual, and as a member or leader in
DO 10.	diverse teams, and in multidisciplinary settings.
PO 10:	<b>communication</b> : Communicate effectively on complex engineering activities with the
	effective reports and design documentation make effective presentations and give and receive
	clear instructions
PO 11:	<b>Project management and finance</b> : 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

#### **PROGRAMME SPECIFIC OUTCOMES (PSOs):**

<b>PSO 1:</b>	Communication: Design and develop modern communication technologies for building the
	inter disciplinary skills to meet current and future needs of industry.
<b>PSO 2:</b>	VLSI and Embedded Systems: 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
<b>PSO 3:</b>	Signal Processing: Apply the Signal processing techniques to synthesize and realize the issues
	related to real time applications

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr. Ch. Mallikharjuna Rao.	Mr. Ch. Mallikharjuna Rao	Dr. G. Srinivasulu	Dr. Y. Amar Babu



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#### COURSE HANDOUT Part-A

PROGRAM	: I B. Tech., I-Sem., ECE-A
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: Differential Equations
L-T-P STRUCTURE	: 4-1-0
COURSE CREDITS	:4
COURSE INSTRUCTOR	: Dr. K. Jhansi Rani
COURSE COORDINATOR	: Dr. A. Rami Reddy
PRE-REQUISITES	: Differentiation, Integration

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The objective of this course is to introduce the first order and higher order differential equations, functions of several variables. The students will also learn solving of first order partial differential equations.

#### **COURSE OUTCOMES (COs)**

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

CO1: Apply first order and first degree differential equations to find orthogonal trajectories.

CO2: Distinguish between the structure and methodology of solving higher order differential equations with constant coefficients.

CO3: Apply various Numerical methods to solve initial value problem.

CO4: Generate the infinite series for continuous functions and investigate the functional dependence. CO5: Solve partial differential equations using Lagrange's method.

COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	-	-	-	-	-	-	-	1
CO2	3	2	-	2	-	-	-	-	-	-	-	1
CO3	3	2	-	2	-	-	-	-	-	-	-	1
CO4	2	1	-	1	-	-	-	-	-	-	-	1
<b>CO5</b>	3	2	-	2	-	-	-	-	-	-	-	1

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

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", 42<sup>nd</sup>Edition, Khanna Publishers, New Delhi, 2012.

**T2** Dr. B. V. Ramana, "Higher Engineering Mathematics", 1<sup>st</sup>Edition, TMH, New Delhi, 2010. **BOS APPROVED REFERENCE BOOKS:** 

- **R1** M. D. Greenberg, "*Advanced Engineering Mathematics*", 2<sup>nd</sup> Edition, TMH Publications, New Delhi, 2011.
- **R2** Erwin Kreyszig, "Advanced Engineering Mathematics", 8<sup>th</sup> Edition, John Wiley & sons, New Delhi, 2011.
- **R3** W.E. Boyce and R. C. Diprima, "*Elementary Differential Equations*", 7<sup>th</sup> Edition, John Wiley & sons, New Delhi,2011.
- **R4** S. S. Sastry, "*Introductory Methods of Numerical Analysis*" 5<sup>th</sup> Edition, PHI Learning Private Limited, New Delhi, 2012.

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.	Bridge Course	5	17/10/2022 to 22/10/2022					
2.	Introduction to the course	1	24/10/2022		TLM2			
3.	Course Outcomes	1	25/10/2022		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
4.	Introduction to UNIT I	1	26/10/2022	•	TLM2	CO1	T1,T2	<i>.</i>
5.	Formation of Differentia Equations	al 1	27/10/2022		TLM1	CO1	T1,T2	
6.	Exact DE	1	29/10/2022		TLM1	CO1	T1,T2	
7.	Non-exact DE Type I	1	31/10/2022		TLM1	CO1	T1,T2	
8.	Non-exact DE Type II	1	01/11/2022		TLM1	CO1	T1,T2	
9.	Non-exact DE Type III	1	02/11/2022		TLM1	CO1	T1,T2	
10.	Non-exact DE Type IV	1	03/11/2022		TLM1	CO1	T1,T2	
11.	Orthogonal Trajectories (Cartesian)	1	05/11/2022		TLM1	CO1	T1,T2	
12.	Orthogonal Trajectories (Cartesian)	1	7/11/2022		TLM1	CO1	T1,T2	
13.	Orthogonal Trajectories (polar)	1	08/11/2022		TLM1	CO1	T1,T2	
14.	Orthogonal Trajectories (polar)	1	09/11/2022		TLM1	CO1	T1,T2	
15.	TUTORIAL 1	1	10/11/2022		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-I		12				No. of class	es taken:	

## **UNIT-II: Higher Order Differential Equations**

S.		No. of	Tentative	Actual	Teaching	Learning	Text	HOD
No.	Topics to be covered	Classes	Date of	Date of	Learning	Outcome	Book	Sign
		Required	Completion	Completion	Methods	COs	followed	Weekly
16.	Introduction to UNIT II	1	12/11/2022		TLM2	CO2	T1,T2	
17.	Solving a homogeneous DE	1	14/11/2022		TLM1	CO2	T1,T2	
18.	Finding Particular Integral, P.I for $e^{ax+b}$	1	15/11/2022		TLM1	CO2	T1,T2	
19.	P.I for Cos bx or sin bx	1	16/11/2022		TLM1	CO2	T1,T2	
20.	P.I for polynomial function	1	17/11/2022		TLM1	CO2	T1,T2	
21.	P.I for polynomial function	1	19/11/2022		TLM1	CO2	T1,T2	
22.	P.I for $e^{ax+b}v(x)$	1	21/11/2022		TLM1	CO2	T1,T2	
23.	P.I for $e^{ax+b}v(x)$	1	22/11/2022		TLM1	CO2	T1,T2	

24.	P.I for $x^{k}v(x)$	1	23/11/2022	TLM1	CO2	T1,T2	
25.	P.I for $x^k v(x)$	1	24/11/2022	TLM1	CO2	T1,T2	
26.	Method of Variation of parameters	1	26/11/2022	TLM1	CO2	T1,T2	
27.	Method of Variation of parameters	1	28/11/2022	TLM1	CO2	T1,T2	
28.	TUTORIAL 2	1	29/11/2022	TLM3	CO2	T1,T2	
No. of classes required to complete UNIT-II		13			No. of class	es taken:	

## UNIT-III: Numerical solution of Ordinary Differential Equations

<b>S.</b>		No. of	Tentative	Actual	Teaching	Learning	Text	HOD
No.	Topics to be covered	Classes	Date of	Date of	Learning	Outcome	Book	Sign
		Required	Completion	Completion	Methods	COs	followed	Weekly
29.	Introduction to Unit-III	1	30/11/2022		TLM2	CO3	T1,T2	
30.	Numerical Methods	1	01/12/2022		TLM1	CO3	T1,T2	
31.	Solution by Taylor's series	1	03/12/2022		TLM1	CO3	T1,T2	
32.	Solution by Taylor's series	1	05/12/2022		TLM1	CO3	T1,T2	
33.	Picard's Method	1	06/12/2022		TLM1	CO3	T1,T2	
34.	Picard's Method	1	07/12/2022		TLM1	CO3	T1,T2	
35.	Assignment	1	08/12/2022				T1,T2	
	I MI	ID EXAMIN	NATIONS (12-	12-2022 TO 17	7-12-2022)			
36.	Euler's Method	1	10/12/2022		TLM1	CO3	T1,T2	
37.	Modified Euler's Method	1	19/12/2022		TLM1	CO3	T1,T2	
38.	Modified Euler's Method	1	20/12/2022		TLM1	CO3	T1,T2	
39.	Runge- Kutta Method	1	21/12/2022		TLM1	CO3	T1,T2	
40.	Runge- Kutta Method	1	22/12/2022		TLM1	CO3	T1,T2	
41.	TUTORIAL 3	1	24/12/2022		TLM3	CO3	T1,T2	
No	. of classes required to complete UNIT-III	12			No. of class	es taken:		

#### **UNIT-IV: Functions of Several Variables**

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
42.	Introduction to UNIT IV	1	26/12/2022		TLM2	CO4	T1,T2	
43.	Generalized Mean Value Theorem, Taylor's series	1	27/12/2022		TLM1	CO4	T1,T2	
44.	Maclaurin's series	1	28/12/2022		TLM1	CO4	T1,T2	
45.	Functions of several variables	1	29/12/2022		TLM1	CO4	T1,T2	
46.	Functions of several variables	1	31/12/2022		TLM1	CO4	T1,T2	
47.	Jacobians( Cartesian coordinates)	1	02/01/2023		TLM1	CO4	T1,T2	

48.	Jacobians (polar, coordinates)	1	03/01/2023	TLM1	CO4	T1,T2	
49.	Jacobians (cylindrical, spherical coordinates)	1	04/01/2023	TLM1	CO4	T1,T2	
50.	Functional dependence	1	05/01/2023	TLM1	CO4	T1,T2	
51.	Functional dependence	1	07/01/2023	TLM1	CO4	T1,T2	
52.	Maxima and Minima	1	09/01/2023	TLM1	CO4	T1,T2	
53.	Maxima and Minima of functions of two variables	1	16/01/2023	TLM1	CO4	T1,T2	
54.	Maxima and Minima of functions of two variables	1	17/01/2023	TLM1	CO4	T1,T2	
55.	TUTORIAL 4	1	18/01/2023	TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-IV			14		No. of clas	ses taken:	

#### **UNIT-V: 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
56.	Introduction to UNIT V	1	19/01/2023		TLM2	CO5	T1,T2	
57.	Partial Differential equations	1	21/01/2023		TLM1	CO5	T1,T2	
58.	Formation of PDE by elimination of arbitrary constants	1	23/01/2023		TLM1	CO5	T1,T2	
59.	Formation of PDE by elimination of arbitrary functions	1	24/01/2023		TLM1	CO5	T1,T2	
60.	Formation of PDE by elimination of arbitrary functions	1	25/01/2023		TLM1	CO5	T1,T2	
61.	Formation of PDE by elimination of arbitrary functions	1	28/01/2023		TLM1	CO5	T1,T2	
62.	Solving of PDE	1	30/01/2023		TLM1	CO5	T1,T2	
63.	Solving of PDE	1	31/01/2023		TLM1	CO5	T1,T2	
64.	Lagrange's Method	1	01/02/2023		TLM1	CO5	T1,T2	
65.	Lagrange's Method	1	02/02/2023		TLM1	CO5	T1,T2	
66.	Lagrange's Method	1	04/02/2023		TLM1	CO5	T1,T2	
67.	TUTORIAL 5	1	06/02/2023		TLM3	CO5	T1,T2	
68.	Assignment	1	07/02/2023			CO3, CO4, CO5	T1,T2	
69.	Revision	1	08/02/2023			CO3, CO4, CO5	T1,T2	
70.	Revision	1	11/02/2023			CO1, CO2	T1,T2	
No	b. of classes required to complete UNIT-V	12			No. of class	ses taken:		

#### Contents beyond the Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly			
71.	Lagrange's Method Other models	1	12/02/2023		TLM1	CO4	T1,T2				
72.	Solving of PDE other methods	1	07/02/2023		TLM5	CO5	T1,T2				
	No. of classes	2			No. of clas	ses taken:					
	II MID EXAMINATIONS (13-02-2023 TO 18-02-2023)										

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

#### PART-C

## EVALUATION PROCESS (R20 Regulation):

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

#### PART-D

#### **PROGRAMME OUTCOMES (POs):**

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

	Communication: Communicate effectively on complex engineering activities with the engineering
PO 10	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.
	Project management and finance: Demonstrate knowledge and understanding of the engineering
PO 11	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.
DO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in
FU 12	independent and life-long learning in the broadest context of technological change.

Dr.K.JHANSI RANI	K.JHANSI RANI Dr. A. RAMI REDDY		Dr. A. RAMI REDDY		
Course Instructor	Course Coordinator	Module Coordinator	HOD		

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING (Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi, NAAC Accredited with 'A' grade, Accredited by NBA, Certified by ISO 9001:2015) L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

#### **COURSE HANDOUT**

	Part-A
PROGRAM	: B. Tech., I-Sem., ECE-A
ACADEMIC YEAR	: 2022-2023
COURSE NAME & CODE	: Applied Physics-20FE07
L-T-P STRUCTURE	: 3-1-0
COURSE CREDITS	:3
COURSE INSTRUCTOR	: Dr. S. YUSUB
COURSE COORDINATOR	: Mr. N.T. Sarma

**COURSE EDUCATIONAL OBJECTIVES (CEOs) :** The basic concepts of Optics such as Interference, Diffraction, Lasers and Optical Fibers. The principle of quantum mechanics, free electron theory of metals, Concept of semi conductors, different types of polarizations in dielectrics and their applications.

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

**CO1:** Define the nature of interference and diffraction (**Remember-L1**).

**CO2:** Apply the lasers and optical fibres in different fields (**Apply-L3**).

CO3: Estimate the electrical conductivity of metals (Understand-L2).

CO4: Analyze the properties of semiconducting materials (Understand-L2).

CO5: Classify the different types of magnetic and dielectric materials (Understand-L2).

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

				APPL	JED PH	IYSICS	5					
COURSE DESIGNED BY	FRES	FRESHMAN ENGINEERING DEPARTMENT										
Course Outcomes	Progr	amme (	Jutcom	es								
PO's →	1	2	3	4	5	6	7	8	9	10	11	12
C01.	3	3	1	1	1	1	1					1
CO2.	3	3	2	1	1	1	1					1
CO3.	3	3	1	1	1	1	1					1
CO4.	3	3	1	1	1	1	1					1
CO5.	3	3	1	1	1	1	1					1
1 = slight (Low) 2 = Moderate (Medium) 3 = Substantial (High)												

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

#### **BOS APPROVED TEXT BOOKS:**

#### **TEXT BOOKS**

- 1. V. Rajendran, "Engineering Physics", TMH, New Delhi, 6th Edition, 2014.
- 2. M.N. Avadhanulu, P.G. Kshirsagar, "Engineering *Physics*", S. Chand & Co., 2<sup>nd</sup> Edition, 2014.

#### REFERENCES

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

#### **Part-B**

#### **COURSE DELIVERY PLAN (LESSON PLAN): ECE-A UNIT-I : Interference and diffraction**

S.No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	Learning Outcome	Text Book	HOD Sign
1.	Course Outcomes Principle of superposition	1	17-10-2022		TLM1	CO1	T1	weekiy
2.	Coherence Conditions for interference	1	19-10-2022		TLM1	CO1	T1	
3.	Interference in thin films	1	20-10-2022		TLM2	CO1	T1	
4.	Newton's rings	1	21-10-2022		TLM1	CO1	T1	
5.	Michelson interferometer	1	22-10-2022		TLM1	CO1	T1	
6.	Fraunhofer diffraction Single slit	1	26-10-2022		TLM1	CO1	T1	
7.	Circular aperture	1	27-10-2022		TLM1	CO1	T1	
8.	Diffraction Grating, Resolving power of Grating	1	28-10-2022		TLM2	CO1	T1	
No. of compl	classes required to ete UNIT-I	8			No. of cla	sses taken:		

#### **UNIT-II : LASERS AND OPTICAL FIBERS**

		No. of	Tentative	Actual	Teaching	Learning	Text	HOD
S.No.	Topics to be covered	Classes	Date of	Date of	Learning	Outcome	Book	Sign
		Required	Completion	Completion	Methods	COs	followed	Weekly
	Principle of laser,	1			TLM1	CO2	T1	
9.	Characteristics of		29-10-2022					
	Laser.							

10.	Einstein's coefficients	1	31-10-2022	TLM1	CO2	T1	
11.	NdYAG laser	1	02-11-2022	TLM2	CO2	T1	
12.	He-Ne laser	1	03-11-2022	TLM1	CO2	T1	
13.	Tutorial-1	1	04-11-2022	TLM3	CO2	T1	
14.	Applications of lasers	1	05-11-2022	TLM1	CO2	T1	
15.	Optical Fiber principle	1	07-11-2022	TLM1	CO2	T1	
16.	Structure of optical fiber	1	09-11-2022	TLM2	CO2	T1	
17.	Numerical Aperture and Acceptance angle	1	10-11-2022	TLM1	CO2	T1	
18.	Tutorial-2	1	11-11-2022	TLM3	CO2	T1	
19.	Types of optical fibers, Applications	1	14-11-2022	TLM2	CO2	T1	
No. or comp	f classes required to lete UNIT-II	10		No. of cla	asses taken	:	

## UNIT-III : PRINCIPLES OF QUANTUM MECHANICS & FREE ELECTRON THEORY

S. No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followe d	HOD Sign Weekly
20	Introduction to Unit III, de-Broglie hypothesis	1	16-11-2022		TLM1	CO3	T1	
	Davisson–Germer	1			TLM2	CO3	T1	
21	Experiment		17-11-2022					
22	Tutorial-3	1	18-11-2022		TLM3	CO3	T1	
23	Schrodinger wave equation,	1	19-11-2022		TLM1	CO3	T1	
24	physical significance of the wave function	1	21-11-2022		TLM2	CO3	T1	
25	particle in a box	1	23-11-2022		TLM1	CO3	T1	
26	Revision	1	24-11-2022		TLM1	CO3	T1	
27	Tutorial-4	1	25-11-2022		TLM3	CO3	T1	
28	Revision	1	26-11-2022		TLM2	CO3	T1	
29	Revision	1	28-11-2022		TLM1	CO3	T1	
30	Revision	1	30-11-2022		TLM1	CO2	T1	

	<b>D</b> • •	1			<b>GO2</b>	<b>T</b> 1	T
31	Revision	1	01-12-2022	TLMI	CO2	TI	
32	Tutorial-5	1	02-12-2022	TLM3	CO2	<b>T</b> 1	
33	Revision	1	02-12-2022	TLM2	CO2	T1	
34	Revision	1	03-12-2022	TLM1	CO1	T1	
35	Revision	1	05-12-2022	 TLM2	CO1	T1	-
36	Revision	1	07-12-2022	 TLM1	CO1	T1	-
37	Revision	1	08-12-2022	 TLM2	CO1	T1	-
38	Tutorial-6	1	09-12-2022	 TLM3	CO1	T1	-
		1.5			CO1		1
	• • · · · ·				CO2.		
39	I MID		12-12-2022		CO3		
		1.5			CO1,		-
10			12 12 2022		CO2,		
40	I MID		15-12-2022		CO3		
		1.5			CO1,		_
41	I MID		14 12 2022		CO2,		
41	TMID		14-12-2022		CO3		
		1.5			CO1,		
12	I MID		15-12-2022		CO2,		
72			10 12 2022		CO3		
		1.5			CO1,		-
43	I MID		16-12-2022		CO2,		
15			10 12 2022		CO3		
		1.5			CO1,		1
44	I MID		17-12-2022		CO2,		
					CO3		
	Classical free electron	1		TLM2	CO3	T1	1
	theory- Postulates,						
45	Expression for electrical						
	conductivity and drift		19-12-2022				
	Velocity, Advantages and Draw	1		TLM2	CO3	Т1	-
46	hacks	I	21-12 2022	1 1/11/2		11	
-+0	oucho,		21-12-2022				
47	Fermi-Dirac statistics,	1	22-12-2022	TLM1	CO3	T1	
48	Tutorial-7	1	23-12-2022	TLM3	CO3	T1	

49	Classification of Solids on the basis of Band	1		TLM1	CO3	T1	
	theory.		24-12-2022				
No.	of classes required to	16		No. of class	es taken: 1	5	

## complete UNIT-III 16 UNIT-IV: SEMI CONDUCTOR PHYSICS

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
	Introduction to unit IV,	1			TLM1	CO4	T1	
50.	Semiconductors		26-12-2022					
51.	Carrier concentration in n-type semiconductor	1	28-12-2022		TLM2	CO4	T1	
52.	Conductivity of intrinsic semiconductor	1	29-12-2022		TLM1	CO4	T1	
53.	Tutorial-8	1	30-12-2022		TLM3	CO3	T1	
54.	Carrier concentration in p-type semiconductor,	1	31-12-2022		TLM1	CO4	T1	
55.	Conductivity of extrinsic semiconductor	1	02-01-2023		TLM2	CO4	T1	
56.	Drift and diffusion Einstein relation,	1	04-01-2023		TLM1	CO4	T1	
57.	Hall effect,	1	05-01-2023		TLM2	CO4	T1	
58.	Tutorial-9	1	06-01-2023		TLM3	CO4	T1	
59.	Solar cell,	1	07-01-2023		TLM2	CO4	T1	
60.	Applications of solar cells,	1	09-01-2023		TLM1	CO4	T1	
	Direct and indirect	1				CO4	T1	
61.	band gap semiconductors		11-01-2023		TLM2			
No. of	f classes required to	14			No of a	lassas taka	n• 1/	
comp	lete UNIT-IV	14			INO. OF C	lasses takel	11:14	

## UNIT-V : MAGNETIC AND DIELECTRIC MATERIALS

		No. of	Tentative	Actual	Teaching	Learning	Text	HOD
S.No.	Topics to be covered	Classes	Date of	Date of	Learning	Outcome	Book	Sign
-		Required	Completion	Completion	Methods	COs	followed	Weekly
	Magnetic parameters,	1			TLM1	CO5	T1	
	Classification of							
	magnetic materials							
62.	Diamagnetic,							
	paramagnetic and							
	ferromagnetic		12-01-2023					
	materials							
63	TUTORIAL-10	1	13-01-2023		TLM3	CO5	<b>T</b> 1	
05.	TOTORIAL-10							
64	Hysteresis, soft and	1	16-01-2023		TLM2	CO5	T1	
04.	hard magnetic							

	materials						
65.	Applications of Ferro	1	16-01-2023	TLM1	CO5	T1	
	Electronic polarization	1		TLM2	CO5	T1	
66.	Orientation polarization		18-01-2023				
67.	Local field, Clausius- Mossitti relation	1	19-01-2023	TLM1	CO5	T1	
68.	TUTORIAL-11	1	20-01-2023	TLM3	CO5	T1	
69.	Applications of dielectric materials,	1	21-01-2023	TLM2	CO5	T1	
70.	Revision	1	23-01-2023	TLM1	CO5	T1	
71.	Revision	1	25-01-2023	TLM1	CO5	T1	
72.	TUTORIAL-12	1	27-01-2023	TLM3	CO5	T1	
73.	Revision	1	28-01-2023	TLM1	CO3	T1	
74.	Revision	1	30-01-2023	TLM1	CO3	T1	
75.	Revision	1	01-02-2023	TLM1	CO3	T1	
76.	Revision	1	01-02-2023	TLM1	CO4	T1	
77.	Revision	1	02-02-2023	TLM1	CO4	T1	
78.	TUTORIAL-13	1	03-02-2023	TLM3	CO4	T1	
79.	Revision	1	04-02-2023	TLM1	CO4	T1	
80.	Revision	1	06-02-2023	TLM1	CO4	T1	
81.	Revision	1	08-02-2023	TLM1	CO5	T1	
82.	Revision	1	09-02-2023	TLM1	CO5	T1	
83.	TUTORIAL-14	1	10-02-2023	TLM3	CO5	T1	
84.	Revision	1	11-02-2023	TLM1	CO5	T1	
No. of compl	f classes required to lete UNIT-V	7		No. of cla	asses taken	:	

## Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
85.	SEM	1	08-02-2023		TLM1		R1	
86.	Conventional energy	1	11-02-2023		TLM1		R1	

	sources							
75	Mid II	1	13-02-2023			CO3, CO4, CO5		
76	Mid II	1	14-02-2023			CO3, CO4, CO5		
77	Mid II	1	15-02-2023			CO3, CO4, CO5		
78	Mid II	1	16-02-2023			CO3, CO4, CO5		
79	Mid II	1	17-02-2023			CO3, CO4, CO5		
80	Mid II	1	18-02-2023			CO3, CO4, CO5		
81	Preparation and Practicals	20-02-2023 to 25-02-2023						
82	Semester end examinations	27-02-2023 to 11-03-2023						

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

Part - C

#### **EVALUATION PROCESS: Evaluation Task** COs Marks 1 A1=5 Assignment/Quiz – 1 Assignment/Quiz – 2 2 A2=5 I-Mid Examination 1,2 B1=20 3 Assignment/Quiz – 3 A3=5 Assignment/Quiz – 4 4 A4=5 5 Assignment/Quiz – 5 A5=5 **II-Mid Examination** 3,4,5 B2=20 Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5 1,2,3,4,5 A=5 Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2) 1,2,3,4,5 B=20 **Cumulative Internal Examination : A+B** 1,2,3,4,5 A+B=25 **Semester End Examinations** 1,2,3,4,5 C=75 **Total Marks: A+B+C** 1,2,3,4,5 100 PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Graduates of Information Technology programme will be:

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

#### **PROGRAM OUTCOMES:**

Engineering Graduates will be able to:

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

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

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

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

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

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

7. Environment and sustainability: Understand the impact of the professional engineering solution sin societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

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

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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

#### PROGRAM SPECIFIC OUTCOMES (PSOs):

Graduate of the Information Technology will have the ability to

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

Dr. S. YUSUB	N.T. Sarma	Dr. S. YUSUB	Dr. A. RAMI REDDY
Course Instructor	Course Coordinator	Module Coordinator	HOD



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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE HANDOUT

#### PART-A

Name of Course Instructor: Mr. B Sagar					
Course Name & Code	: PC-I, 20FE01				
L-T-P Structure	: 2-0-0				
Program/Sem/Sec	: ECE-A –I SEM				
A.Y.	: 2022-23				

Credits: 02

PREREQUISITE: NIL

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** To improve English language proficiency of the students on various aspects like vocabulary, grammar, communication skills, listening skills, Reading &Writing skills.

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

CO1	Write sentences and paragraphs using proper grammatical structures and word forms.	L1
CO2	Comprehendthegiventextbyemployingsuitablestrategiesforskimmingand Scanning and draw inferences	L2
CO3	Write summaries of reading texts using correct tense forms & Appropriate structures.	L1
CO4	Write Formal Letters; Memos & E-Mails	L3
CO5	Edit the sentences/short texts by identifying basic errors of grammar/ vocabulary/syntax	L2

Unit-I

**Exploration** - 'A Proposal to Girdle the Earth – Nellie Bly'; Reading: Skimming for main idea; Scanning for specific information; Grammar & Vocabulary: Content Words; Function Words; Word Forms: verbs, nouns, adjectives and adverbs; Nouns: Countable and Uncountable, Singular and Plural forms; Wh - Questions; Word Order in Sentences; Writing: Paragraph Analysis; Paragraph Writing; Punctuation and Capital Letters

#### Unit–II

**On Campus**- 'The District School as it Was by One Who Went to it – Warren Burton'; Reading: Identifying Sequence of Ideas;

Grammar Vocabulary: Cohesive Devices: Linkers/signposts/Transition signals, Synonyms, Meanings of Words/Phrases in the context; Writing: Memo Drafting.

#### Unit–III

Working Together- 'The Future of Work'

Reading: Making basic inferences; Strategies to use text clues for comprehension; Summarizing; Grammar & Vocabulary: Verbs: Tenses; Reporting Verbs for Academic Purpose; Writing: Rephrasing what is read; Avoiding redundancies and repetitions Abstract Writing/Summarizing.

#### Unit–IV

**'A.P.J. Abdul Kalam'**; Grammar & Vocabulary: Direct & Indirect Speech; articles and their Omission; Writing: E-Mail Drafting.

#### Unit–V

**'C.V. Raman'**; Grammar Vocabulary: Subject-verb Agreement; Prepositions; Writing: Formal Letter Writing.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1		1		1			3	3		2			
CO2		1		1		1			3	3		2			
CO3		1		1		1			3	3		2			
CO4		1		1		1			3	3		2			
CO5		1		1		1			3	3		2			
			<b>1</b> - Lo	W			<b>2</b> –M	edium	۱			<b>3 -</b> Higl	า		

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

#### **TEXTBOOKS:**

- T1 Prabhavati. Y & etal , "English All Round –Communication Skills for Undergraduate Learners" ,Orient Black Swan, Hyderabad, 2019
- T2 "The Great Indian Scientists" published by Cengage Learning India Pvt. Ltd., Delhi, 2017

#### **REFERENCE BOOKS:**

- **R1** Swan, M., "Practical English Usage", Oxford University Press, 2016.
- **R2** Kumar, Sand Latha, P, "Communication Skills", Oxford University Press, 2018.

- **R3** Rizvi Ashraf M "Effective Technical Communication", Tata Mc Graw Hill, New Delhi, 2008.
- **R4** Baradwaj Kumkum, "Professional Communication", I. K. International Publishing House Pvt, NewDelhi,2008.
- **R5** Wood, F. T., "Remedial English Grammar", Macmillan, 2007.

#### PART-B

#### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to syllabus	01	17-10-2022		TLM2	
2.	Proposal to Girdle The Earth by Nellie Bly	02	20-10-2022 22-10-2022		TLM2	
3.	Reading: Skimming for main idea ; Scanning for specific information	01	27-10-2022		TLM2	
4.	Content words and Function words	01	29-10-2022		TLM2	
5.	Word forms – verbs; Adjectives & adverbs	01	31-10-2022		TLM2	
6.	Nouns – countable & uncountable, singular and plural nouns Word order in sentences, "Wh" questions	01	03-11-2022		TLM2	
7.	Writing: Paragraph writing, Paragraph analysis	02	05-11-2022 07-11-2022		TLM2 TLM6	
No. o	of classes required to comple	te UNIT-I: 0	9	No. of classe	s taken:	

#### UNIT-II:

S.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
INO.		Required	Completion	Completion	Methods	Weekly
8.	The District School As It Way by One Who Went to it - Warren Burton	02	10-11-2022 12-11-2022		TLM2	
9.	Identifying sequence of ideas	01	14-11-2022		TLM2	
10.	Cohesive devices: linkers /signposts/transition signals	02	17-11-2022 19-11-2022		TLM2	

11.	Synonyms meanings of words / Phrases in the context	02	21-11-2022 24-11-2022		TLM2	
12.	Essay Writing - Memo drafting	02	26-11-2022 28-11-2022		TLM2 TLM6	
No. d	of classes required to complet	No. of classe	s taken:			

#### UNIT-III:

S. No.	Topics to be covered	No. of Classes Require D	Tentative Date of Completion	Actua Date c Complet	l Teaching of Learning ion Methods	HOD Sign Weekly
13.		02	01-12-2022		TLM2	
	The Future of Work		03-12-2022		TLM6	4
14.	Making basic inferences, Strategies to uses text clues for comprehension	01	05-12-2022		TLM2	
15.	Verbs :tenses, reporting verbs for academic purpose	02	08-12-2022 10-12-2022		TLM2	
16.	Summarizing rephrasing what is read	01	19-12-2022		TLM2	
17.	avoiding redundancies and repetitions - Abstract Writing	02	22-12-2022 24-12-2022		TLM2 TLM6	
	No. of classes required to co	mplete UN	NIT-III: 08	N	o. of classes ta	ken:

#### UNIT-IV:

S. No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
		Required	Completion	Completion	Methods	Weekly
			26-12-2022		TIMO	
18.	APJ Abdul Kalam	02	29-12-2023			
					TLM2	
10	Direct Indirect speech	02	31-12-2023		TIMO	
19.	Direct-indirect speech	02	02-01-2023		I LIVIZ	
20	Articles and their ornigsion	02	05-01-2023		TIMO	
20.	Articles and their offission	02	07-01-2023		I LIVIZ	
21	E mail drafting	02	09-01-2023		TLM2	
21.	E-man drannig	02	19-01-2023		TLM6	
No.	of classes required to comple	te UNIT-IV:	08	No. of classe	s taken:	

#### UNIT-V:

S.		No. of	Tentative	Actual	Teaching	HOD
No	Topics to be covered	Classes	Date of	Date of	Learning	Sign
NO.		Required	Completion	Completion	Methods	Weekly
22	C V Romon	02	21-01-2023		TINAO	
22.	C. V. Kalliali	02	23-01-2023		I LIVIZ	
22	Subject Verbagreement	02	28-01-2023		TINO	
23.	Subject – verb agreement	02	30-01-2023		I LIVIZ	

24	Prepositions	01	02-02-2023		TINAO	
24.	24. Prepositions	01	04-02-2023	I LIVIZ		
25	Formal Letter Writing	02	06-02-2023		TLM2	
25.		02	09-02-2023		TLM6	
26.	vocabulary	01	11-02-2023			
No. o	f classes required to comple	No. of classe	s taken:			

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

## PART-C

## EVALUATION PROCESS (R17 Regulation):

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

#### PART-D

#### PROGRAMME OUTCOMES (POs):

	Engineering knowledge: Apply the knowledge of mathematics, science, engineering					
PO 1	fundamentals, and an engineering specialization to the solution of complex					
	Problem analysis: Identify formulate review research literature and analyze					
PO 2	complex engineering problems reaching substantiated conclusions using first					
	principles of mathematics, natural sciences, and engineering sciences.					
	Design/development of solutions: Design solutions for complex engineering					
00.2	problems and design system components or processes that meet the specified needs					
PU 3	with appropriate consideration for the public health and safety, and the cultural,					
	societal, and environmental considerations.					
	Conduct investigations of complex problems: Use research-based knowledge and					
PO 4	research methods including design of experiments, analysis and interpretation of					
	data, and synthesis of the information to provide valid conclusions.					
	Modern tool usage: Create, select, and apply appropriate techniques, resources, and					
PO 5	modern engineering and IT tools including prediction and modelling to complex					
	engineering activities with an understanding of the limitations					
DOC	The engineer and society: Apply reasoning informed by the contextual knowledge to					
PO 6	assess societal, health, safety, legal and cultural issues and the consequent					
	Environment and sustainability: Understand the impact of the professional					
PO 7	engineering solutions in societal and environmental contexts and demonstrate the					
107	knowledge of, and need for sustainable development					
	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities					
PO 8	and norms of the engineering practice.					
<b>DO 0</b>	Individual and team work: Function effectively as an individual, and as a member or					
PO 9	leader in diverse teams, and in multidisciplinary settings.					
	Communication: Communicate effectively on complex engineering activities with the					
PO 10	engineering community and with society at large, such as, being able to					
1010	comprehend and write effective reports and design documentation, make					
	effective presentations, and give and receive clear instructions					
	Project management and finance: Demonstrate knowledge and understanding of the					
PO 11	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.					
DO 12	che-long learning: Recognize the need for, and have the preparation and ability to					
FU 12						
	change.					

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.B Sagar	Dr. B. Samrajya Lakshmi	Dr. B. Samrajya Lakshmi	Dr. A. Ramireddy
Signature				

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## **DEPARTMENT OF ECE**

## COURSE HANDOUT

## PART-A

Name of Course Instructor: Dr. G. Srinivasulu, ProfessorCourse Name & Code: EDC Lab-20EC51Regulation:R20L-T-P Structure: 0-0-3Credits: 1.5Program/Sem/Sec: B. Tech. I-Sem., ECE A SecA.Y.: 2022-23

**PREREQUISITE:** Nil

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**: This course introduces the characteristics and applications of semiconductor devices; emphasis is placed on characteristics and testing practically to strengthen the knowledge.

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

CO1	Demonstrate the characteristics of Diodes, BJT, FET, Voltage regulators, Diode applications
<u> </u>	Analyze the device parameters of Diodes, Bipolar Junction Transistors, and Field Effect
02	Transistors for its electrical parameters using VI characteristics
<u> </u>	Apply the knowledge of diodes, Capacitors and transistors for the realization of rectifiers,
03	regulators, Clippers and Clampers circuits
CO4	Adapt effective Communication, presentation and report writing skills

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

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
C01	2	1	-	-	-	-	-	-	-	-	-	-	-	1	-
CO2	3	1	-	-	-	-	-	-	-	-	1	1	-	2	-
CO3	3	1	1	-	-	-	-	-	-	-	-	-	-	2	-
CO4	-	-	-	-	-	-	-	-	3	2	-	-	-	-	-
		1	- Low			2	-Medi	ium			3	- High			

**TEXTBOOKS:** 

**T1** Jacob Millman, Christos C Halkias, Electronic Devices and Circuits, Third edition, Tata McGraw Hill, Publishers, New Delhi. 2012

#### **REFERENCE BOOKS:**

**R1** Ben Streetman and Sanjay Banerjee, Solid State Electronic Devices, Fourth edition, Prentice Hall Publishers, 2014

### PART-B

#### **COURSE DELIVERY PLAN (LESSON PLAN):**

S. No.	Topics to be covered (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	COs, Identification of components, Active and Passive Devices, Study and operation of Regulated Power Supplies, CRO and Function generators	3	31.10.2022			
2.	Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode using Characteristics	3	07.11.2022			

3.	Reali evalu with	zation and performance Jation of Half wave rectifier and without Capacitor filter	3		14.11.2	022			
4.	Reali evalu with	zation and performance Jation of Full wave rectifier and without Capacitor filter	3		21.11.2	022			
5.	Anal Conf Outp gains	ysis of Transistor CB iguration for its Input and out resistances and Current s using VI Characteristics	3		28.11.2	022			
6.	Anal Conf Outp gains	ysis of Transistor CE iguration for its Input and out resistances and Current s using VI Characteristics	3		05.12.2	022			
7.	Anal Char Tran Tran Amp	ysis of Drain and Transfer acteristics of Field Effect sistor for its Drain Resistance, sconductance and lification factor	3		19.12.2	022			
8.	Dete volta of Ze	rmination of Breakdown ge of Zener diode and Design ner Voltage regulator	3		26.12.2	022			
9.	Desi Volta bias	3		02.01.2	023				
10.	Desi Volta bias	gn and Realization of Shunt age Clippers with and without voltage	3		16.01.2	023			
11.	Desi Clam capa	gn and Realization of Voltage pers circuits using Diode and citors	3		23.01.2	023			
12.	Reali using	zation of Voltage multiplier g Clampers.	3		30.01.2	023			
No. c	No. of classes required to complete : 24 No. of classes taken:								
Teac	ching	Learning Methods							
TL	M1	Chalk and Talk		]	LM4	Den	nonstration (	[Lab/Field	Visit)
TL	M2	PPT		]	LM5	M5 ICT (NPTEL/Swayam Prabha/MOOCS)			
TL	M3	Tutorial		]	rlm6	Gro	up Discussio	n/Project	

## PART-C

## EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Expt. no's	Marks
Day to Day work $= \mathbf{A}$	1,2,3,4,5,6,7,8	A=05
Record $=$ <b>B</b>	1,2,3,4,5,6,7,8	B=05
Internal Test = $\mathbf{C}$	1,2,3,4,5,6,7,8	C = 05
Cumulative Internal Examination : A + B + C = 15	1,2,3,4,5,6,7,8	15
Semester End Examinations = D	1,2,3,4,5,6,7,8	D = 35
Total Marks: $A + B + C + D = 50$	1,2,3,4,5,6,7,8	50

## PART-D

## PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

<b>PEO 1</b>	То	Attain	а	solid	foundation	in	Electronics	&	Communication	Engineering
	fundamentals with an attitude to pursue continuing education									
<b>PEO 2</b>	To	Function	pre	ofessio	nally in the ra	apidl	ly changing w	vorld	with advances in	technology

PEO 3	To Contribute to the needs of the society in solving technical problems using
	Electronics & Communication Engineering principles, tools and practices
<b>PEO 4</b>	To Exercise leadership qualities, at levels appropriate to their experience, which
	addresses issues in a responsive, ethical, and innovative manner?
PROGR/	AMME OUTCOMES (POs):
PO 1	<b>Engineering knowledge</b> : 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	<b>Design/development of solutions</b> : 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
PU 5	wodern tool usage: Create, select, and apply appropriate techniques, resources, and modern angingering and IT tools including prediction and modelling to complex
	and indefine engineering and it tools including prediction and moderning to complex
PO 6	The angineer and society: Apply reasoning informed by the contextual knowledge to
FUO	assess societal health safety legal and cultural issues and the consequent
	responsibilities relevant to the professional engineering practice
PO 7	<b>Environment and sustainability</b> : Understand the impact of the professional
107	engineering solutions in societal and environmental contexts and demonstrate the
	knowledge of, and need for sustainable development
PO 8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities
	and norms of the engineering practice
PO 9	<b>Individual and team work</b> : Function effectively as an individual, and as a member or
	leader in diverse teams, and in multidisciplinary settings
PO 10	<b>Communication</b> : 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	<b>Project management and finance</b> : 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
PROGRA	AMME SPECIFIC OUTCOMES (PSOs):
<b>PSO 1</b>	Design and develop modern communication technologies for building the inter

# PS01Design and develop modern communication technologies for building the inter<br/>disciplinary skills to meet current and future needs of industryPS02Design and Analyze Analog and Digital Electronic Circuits or systems and Implement<br/>real time applications in the field of VLSI and Embedded Systems using relevant toolsPS03Apply the Signal processing techniques to synthesize and realize the issues related to<br/>real time applications

Head of the Department



#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

## COURSE HANDOUT PART-A

Name of Course Instructor	: Mr.Ch. MallikharjunaRao/Mrs.G.Venk	at Rao/ Mr.K.V.Ashok
Course Name & Code	: Basic Electrical Engineering Lab	
L-T-P Structure	: 0-0-3	Credits: 1.5
Program/Sem/Sec	: B.Tech., ECE., I-Sem., Section- A	A.Y : 2022-23

#### **PREREQUISITE:** Nil

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** This is a course to expose basic circuit concepts, circuit modeling and methods of circuit analysis in time domain and frequency domain for solving simple circuits including DC and AC circuit theory and network theorems.

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

C01	<b>Interpret</b> the behavior of passive components of electrical circuits, inductance of magnetic circuits, two port networks and principle of DC machines using fundamental electrical laws and mathematical models. <b>(Understand – L2)</b>
CO2	<b>Apply</b> Kirchhoff's laws, Network theorems to verify the linear electrical circuits using fundamental electrical laws and mathematical equations. <b>(Apply – L3)</b> .
CO3	<b>Examine</b> the active & reactive powers of single phase electrical circuits and resonant frequency, bandwidth & quality factor of electrical circuits. <b>(Apply – L3)</b>
<b>CO4</b>	Adapt effective Communication, presentation and report writing skills.(Apply – L3)

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

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
C01	3	2	1	1	-	-	-	-	-	2	-	-	-	-	2
CO2	3	3	1	1	-	-	-	-	-	2	-	-	-	-	2
CO3	3	2	1	1	-	-	-	-	-	2	-	-	-	-	3
CO4	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-
<b>1</b> - Low				2 – Medium				<b>3 -</b> High							

#### **TEXT BOOKS:**

T1 Ravish R Singh, "Network Analysis and synthesis", Tata McGraw Hill Pvt Ltd, New Delhi.2013

T2 B.L Theraja, A.K. Theraja, "Electrical Technology in S.I. UNITS. Volume II. AC & DC MACHINES"Published by S. Chand & Company Ltd 2016.

#### **REFERENCE BOOKS:**

- **R1** M.S Naidu and S. Kamakshaiah, "Introduction to Electrical Engineering", TMH Publication, 3<sup>rd</sup> edition 2017.
- **R2** A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7<sup>th</sup> Edition, New Delhi 2017.

## PART-B

## COURSE DELIVERY PLAN (LESSON PLAN): BATCH-I(Roll No:22761A0434 to 22761A0466)

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.	Demo on Lab Experiments and discussion on Course outcomes of the Lab	3	17/10/2022		TLM1			
2.	Identify and test passive elements in linear electrical circuits.	3	31/10/2022		TLM4			
3.	Determination of closed Loop voltages and node currents using Kirchhoff's laws.	3	07/11/2022		TLM4			
4.	Determination of node voltages and branch currents using voltage division and current division rules.	3	14/11/2022		TLM4			
5.	Determination of Resonant frequency, Bandwidth and Quality factor of RLC circuits.	3	21/11/2022		TLM4			
6.	Analysis of linear circuit branch response using Superposition theorem.	3	28/11/2022		TLM4			
7.	Determination and verification of Voltage & Resistance using Thevenin's theorems, and current & resistance using Norton's theorem.	3	5/12/2022		TLM4			
8.	Determination and verification of power transfer using Maximum power transfer theorem	3	19/12/2022		TLM4			
9.	Determination and verification of Z parameters and Y Parameters of two port network.	3	26/12/2022		TLM4			
10.	Measurement of efficiency of DC machines using Swinburne's test.	3	02/01/2023		TLM4			
11.	Measurement of Torque, Speed and Armature current of DC shunt motor from its characteristics.	3	09/01/2023		TLM4	]		
12.	Determination and verification of transmission parameters	3	23/01/2023		TLM4			
13	Makeup Lab	3	30/01/2023		TLM4	]		
14	Internal Lab Examination	3	06/02/2023		TLM4			
No. of classes required to complete : 42 No. of classes taken:42								

## COURSE DELIVERY PLAN (LESSON PLAN): BATCH-II(Roll No:22761A0401 to 22761A0433)

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.	Demo on Lab Experiments and discussion on Course outcomes of the Lab	3	28/10/2022		TLM1	
2.	Identify and test passive elements in linear electrical circuits.	3	04/11/2022		TLM4	
3.	Determination of closed Loop voltages and node currents using Kirchhoff's laws.	3	11/11/2022		TLM4	
4.	Determination of node voltages and branch currents using voltage division and current division rules.	3	18/11/2022		TLM4	
5.	Determination of Resonant frequency, Bandwidth and Quality factor of RLC circuits.	3	25/11/2022		TLM4	
6.	Analysis of linear circuit branch response using Superposition theorem.	3	02/12/2022		TLM4	
7.	Determination and verification of Voltage & Resistance using Thevenin's theorems, and current & resistance using Norton's theorem.	3	09/12/2022		TLM4	
8.	Determination and verification of power transfer using Maximum power transfer theorem	3	23/12/2022		TLM4	
9.	Determination and verification of Z parameters and Y Parameters of two port network.	3	30/12/2022		TLM4	
10.	Measurement of efficiency of DC machines using Swinburne's test.	3	06/01/2023		TLM4	
11.	Measurement of Torque, Speed and Armature current of DC shunt motor from its characteristics.	3	20/01/2023		TLM4	1
12.	Determination and verification of transmission parameters	3	27/01/2023		TLM4	
13.	Makeup Lab	3	03/02/2023		TLM4	
14.	Internal Lab Examination	3	10/02/2023		TLM4	
No. e	of classes required to complete : 42	No. of classe	es taken:42			

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 = <b>A</b>	1,2,3,4,5,6,7,8	A=05
Record = $\mathbf{B}$	1,2,3,4,5,6,7,8	B=05
Internal Test = C	1,2,3,4,5,6,7,8	C = 05
Cumulative Internal Examination : A + B + C = 15	1,2,3,4,5,6,7,8	15
Semester End Examinations = D	1,2,3,4,5,6,7,8	D = 35
Total Marks: $A + B + C + D = 50$	1,2,3,4,5,6,7,8	50

## 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	<b>Problem analysis</b> : 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	<b>Design/development of solutions</b> : 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	<b>Conduct investigations of complex problems</b> : 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	<b>Modern tool usage</b> : Create, select, and apply appropriate techniques, resources,
	and modern engineering and 11 tools including prediction and modelling to
<b>PO 6</b>	The engineering activities with an understanding of the limitations
FUO	knowledge to assess societal health safety legal and cultural issues and the
	consequent responsibilities relevant to the professional engineering practice
PO 7	<b>Environment and sustainability</b> : Understand the impact of the professional
107	engineering solutions in societal and environmental contexts and demonstrate
	the knowledge of and need for sustainable development
PO 8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and
	responsibilities and norms of the engineering practice
PO 9	<b>Individual and team work</b> : Function effectively as an individual, and as a
	member or leader in diverse teams, and in multidisciplinary settings
PO 10	<b>Communication</b> : 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	<b>Life-long learning</b> : 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):**

<b>PSO 1</b>	Design and develop modern communication technologies for building the inter				
	disciplinary skills to meet current and future needs of industry				
<b>PSO 2</b>	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				
<b>PSO 3</b>	Apply the Signal processing techniques to synthesize and realize the issues related				
	to real time applications				

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr.Ch.MallikharjunaRao			
Mr.G.Venkat Rao	Mr. G. Venkata Rao	Dr. G. Srinivasulu	Dr. Y. Amar Babu
Mr.K.V.Ashok			

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING <u>DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING</u> (Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi, NAAC Accredited with 'A' grade, Accredited by NBA, Certified by ISO 9001:2015) L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

## **COURSE HANDOUT**

#### Part-A

PROGRAM	:	B. Tech., I-Sem., ECE-A
ACADEMIC YEAR	:	2022-2023
COURSE NAME & CODE	:	APPLIED PHYSICS LAB & 20 FE 54
L-T-P STRUCTURE	:	0-0-3
COURSE CREDITS	:	1
COURSE INSTRUCTOR	:	Dr. S. YUSUB
COURSE COORDINATOR	:	Mr. N.T. Sarma

#### **Course Educational Objective:**

The theoretical ideas, Analytical techniques, graphical analysis and concepts covered in the lecture by completing a host of experiments with the procedures and observational skills for appropriate use of simple and complex apparatus.

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

CO1: Analyze the wave characteristics of light (Understand-L2).

CO2: Estimate the magnetic field using Stewart's and Gee's apparatus (Understand-L2).

CO3: Verify the characteristics of semi conductor diodes (Apply-L3).

CO4: Determine the acceptance angle and numerical aperture of optical fiber (Apply-L3).

CO5: Improve report writing skills and individual team work with ethical values

(Understand-L2).

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

Applied 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	1	1								1
CO2.	3	3	1	1								1

CO3.	3	3	1	1							1
CO4.	3	3	1	1							1
CO5.								2	2	2	
1 = slight (Low	7)	2 = Moderate ( Medium)			erate (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- ECE-A

S.No ·	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction	3	18-10-2022		TLM4	1,2,3,4	T1	
	Demonstration	_	25-10-2022			CO1, CO2,	T1	
2.		3			TLM4	CO3, CO4,		
			01.11.0000			C05		
	Experiment 1	2	01-11-2022			CO1, CO2,	TI	
3.		3			TLM4	CO3, CO4,		
	<b>F</b>		00.11.0000			C05	<b>T</b> 1	
	Experiment 2	2	08-11-2022		TT > / /	CO1, CO2,	11	
4.		5			1 LN14	CO3, CO4,		
	E		15 11 2022				TT1	
5	Experiment 5	2	15-11-2022		TT N//	CO1, CO2,	11	
5.		5			1 12/11/14	CO3, CO4,		
	Exporimont 4		22 11 2022			C01 C02	T1	
6.	Experiment 4	3	22-11-2022		TLM4	CO1, CO2, CO3, CO4	11	
	Experiment 5		29-11-2022			C01 C02	T1	
7	Experiment 5	3	27 11 2022		TLM4	CO3, CO4,		
/.		5				CO5		
	Demonstration		06-12-2022			CO1. CO2.	T1	
8.		3			TLM4	CO3, CO4,		
						CO5		
	Experiment 6		20-12-2022			CO1, CO2,	T1	
9.	1	3			TLM4	CO3, CO4,		
						CO5		
	Experiment 7		27-12-2022			CO1, CO2,	T1	
10.		3			TLM4	CO3, CO4,		
						CO5		
	Experiment 8		03-01-2023			CO1, CO2,	T1	
11.		3			TLM4	CO3, CO4,		
						CO5		

	Experiment 9		10-01-2023		CO1, CO2,	T1	
12.	I	3		TLM4	CO3, CO4,		
					CO5		
	Experiment 10		17-01-2023		CO1, CO2,	T1	
13.	_	3		TLM4	CO3, CO4,		
					CO5		
	Revision		24-01-2023		CO1, CO2,	T1	
14.		3		TLM4	CO3, CO4,		
					CO5		
	Revision		31-01-2023		CO1, CO2,	T1	
15.		3		TLM4	CO3, CO4,		
					CO5		
	<b>Internal Exam</b>		06-02-2023		CO1, CO2,	<b>T</b> 1	
16.		3		TLM4	CO3, CO4,		
					CO5		
No. of classes required		19		No of class	as takan.		
to con	mplete UNIT-I	40		1 NO. OI Class	es lakell.		

## **EVALUATION PROCESS:**

Evaluation Task	Expt. no's	Marks
Day to Day work $= \mathbf{A}$	1,2,3,4,5,6,7,8	A=5
Internal test $= \mathbf{B}$	1,2,3,4,5,6,7,8	B=5
Evaluation of viva voce $= \mathbf{C}$	1,2,3,4,5,6,7,8	C = 5
Evaluation of attendance Marks = $\mathbf{D}$	1,2,3,4,5,6,7,8	D = 0
Cumulative Internal Examination : A + B + C + D = 15	1,2,3,4,5,6,7,8	15
Semester End Examinations = E	1,2,3,4,5,6,7,8	E = 35
Total Marks: $A + B + C + D + E = 50$	1,2,3,4,5,6,7,8	50

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

(9). Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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

(11). **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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

## PROGRAM SPECIFIC OUTCOMES (PSOs):

Graduate of the 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.

Dr. S. YUSUB /	Mr. N.T. Sharma	Dr. S. YUSUB	Dr A. RAMI REDDY
Mr. N.T. Sharma			
Course Instructor	Course Coordinator	Module Coordinator	HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)



Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230. Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

## **COURSE HANDOUT**

## PART-A

Name of Course Instructor: Mr. Sagar

Course Name & Code	: PCS LAB, 20FE51
L-T-P Structure	: 0-0-2
Program/Sem/Sec	: ECE-A - I SEM
A.Y.	: 2022-23

Credits: 01

PREREQUISITE: NIL

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**: To improve the proficiency of students in English with an emphasis on better communication in formal and informal situations; Develop speaking skills required for expressing their knowledge and abilities and to face interviews with confidence.

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

C01	Introduce one-self and others using appropriate language and details.	L2
CO2	Comprehend short talks and speak clearly on a specific topic using	L2
CO3	Report effectively after participating in informal discussions ethically.	L1
<b>CO4</b>	Interpret data aptly, ethically & make oral presentations without	L3

## Syllabus: Professional Communication Lab (PCS) shall have two parts:

- Computer Assisted Language Learning (CALL) Lab for 60 students with 60 systems, LAN facility and English language software for self-study by learners.
- Interactive Communication Skills (ICS) Lab. with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo – audio & video system and camcorder etc.

## Exercise- I

CALL Lab: Understand- Sentence structure.

**ICS Lab: Practice** -Listening: Identifying the topic, the context and specific information, speaking: Introducing oneself and others.

## Exercise-II

CALL Lab: Understand- Framing questions.

Speaking: Discussing in pairs/small groups on specific topics; Delivering short structured talks using suitable cohesive devices (JAM)

## Exercise-III

CALL Lab: Understand- Comprehension practice–Strategies for Effective Communication

**ICS Lab: Practice** - Listening: Listening for global comprehension and Summarizing Speaking: Discussing specific topics in pairs/small groups, reporting what is discussed

## Exercise-IV

**CALL Lab: Understand-** Features of Good Conversation–Strategies for Effective Communication.

**ICS Lab: Practice** -Listening: making predictions while listening to conversations/transactional dialogues with/without video Speaking: Role – plays – formal & informal – asking for and giving information/directions/instructions/suggestions

## Exercise-V

CALL Lab: Understand- Features of Good Presentation, Methodology of Group Discussion

ICS Lab: Practice –Introduction to Group Discussions.

Listening: Answering questions, identifying key terms and understanding concepts.

Speaking: Formal Oral & Poster presentations on topics from academic contexts without the use of PPT.

## Lab Manual:

1. Prabhavati. Y & etal, "English All Round–Communication Skills for Undergraduate Learners", Orient Black Swan, Hyderabad, 2019.

## Suggested Software:

- 1. Digital Mentor: Globarena, Hyderabad, 2005
- 2. Sky Pronunciation Suite: Young India Films, Chennai, 2009
- 3. Mastering English in Vocabulary, Grammar, Spelling, Composition, Dorling Kindersley, USA, 2001
- 4. Dorling Kindersley Series of Grammar, Punctuation, Composition, USA, 2001
- 5. Oxford Talking Dictionary, The Learning Company, USA, 2002
- 6. Learning to Speak English- 4CDs. The Learning Company, USA, 2002
- 7. Cambridge Advanced Learners English Dictionary (CD). Cambridge University Press, New Delhi, 2008.

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1					3					3	3				
CO2					3					3	3				
CO3					3					3	3				
CO4					3					3	3				
<b>1</b> - Low					2	–Med	ium			3	- High				

## COURSE DELIVERY PLAN (LESSON PLAN):

## UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to syllabus	02	19-10-2022		TLM4	
2.	Self Introduction & Introducing others	02	26-10-2022		TLM4	
3.	Self Introduction & Introducing others	02	02-11-2022		TLM4	
4.	JAM- I(Short and Structured Talks)	02	09-11-2022		TLM4	
5.	JAM-II(Short and Structured Talks)	02	16-11-2022 23-11-2022		TLM4	
6.	Role Play-I(Formal and Informal)	04	30-11-2022 07-12-2022		TLM4	
7.	Role Play-II (Formal and Informal)	02	21-12-2022 28-12-2022		TLM4	
8.	Group Discussion-I (Reporting the discussion)	02	04-01-2023 11-01-2023		TLM4, TLM6	
9.	Group Discussion-II	02	18-01-2023 25-01-2023		TLM4, TLM6	
10.	Oral & Poster Presentation	02	01-02-2023		TLM2, TLM4	
11.	Lab Internal Exam	02	08-02-2023			
No.	of classes required to complete Syll	abus: 48		No. of class	ses taken:	

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

## PART-C

## **EVALUATION PROCESS (R20 Regulation):**

Evaluation Task	Marks
Cumulative Internal Examination (CIE): M	<mark>15</mark>
Semester End Examination (SEE)	<mark>35</mark>
Total Marks = CIE + SEE	50

## **PROGRAMME OUTCOMES (POs):**

	Engineering knowledge, Apply the knowledge of methometics, science, engineering fundamentals
PO 1	<b>Engineering knowledge</b> . Apply the knowledge of mathematics, science, engineering fundamentals,
	and an engineering specialization to the solution of complex engineering problems.
	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering
PO 2	problems reaching substantiated conclusions using first principles of mathematics, natural sciences,
	and engineering sciences.
	Design/development of solutions: Design solutions for complex engineering problems and design
PO 3	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.
	Conduct investigations of complex problems: Use research-based knowledge and research methods
PO 4	including design of experiments, analysis and interpretation of data, and synthesis of the information
	to provide valid conclusions.
	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern
PO 5	engineering and IT tools including prediction and modelling to complex engineering activities with an
	understanding of the limitations
	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal,
PO 6	health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional
	engineering practice
	Environment and sustainability: Understand the impact of the professional engineering solutions in
PO 7	societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable
	development
	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the
PU o	engineering practice.
	Individual and team work: Function effectively as an individual, and as a member or leader in diverse
PO 9	teams, and in multidisciplinary settings.
	Communication: Communicate effectively on complex engineering activities with the engineering
PO 10	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
	Project management and finance: Demonstrate knowledge and understanding of the engineering and
PO 11	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
FU 12	independent and life-long learning in the broadest context of technological change.

	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.B Sagar	Dr. B. Samrajya Lakshmi	Dr. B. Samrajya Lakshmi	Dr. A. Ramireddy
Signature				



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS) Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230. Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE HANDOUT

## PART-A

Name of Course Instructor: Ms. K. SRIDEVI							
Course Name & Code	: PC-I, 20FE01						
L-T-P Structure	: 2-0-0						
Program/Sem/Sec	: ECE-B –I SEM						
A.Y.	: 2022-23						

Credits: 02

PREREQUISITE: NIL

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** To improve English language proficiency of the students on various aspects like vocabulary, grammar, communication skills, listening skills, Reading &Writing skills.

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

CO1	Write sentences and paragraphs using proper grammatical structures and word forms.	L1
CO2	Comprehendthegiventextbyemployingsuitablestrategiesforskimmingand Scanning and draw in ferences	L2
CO3	Write summaries of reading texts using correct tense forms& Appropriate structures.	L1
CO4	Write Formal Letters; Memos & E-Mails	L3
CO5	Edit the sentences/short texts by identifying basic errors of grammar/ vocabulary/syntax	L2

Unit-I

**Exploration** - 'A Proposal to Girdle the Earth – Nellie Bly'; Reading: Skimming for main idea;Scanning for specific information; Grammar & Vocabulary: Content Words; Function Words;Word Forms: verbs, nouns, adjectives and adverbs; Nouns: Countable and Uncountable, Singularand Plural forms; Wh - Questions; Word Order in Sentences; Writing: Paragraph Analysis; Paragraph Writing; Punctuation and CapitalLetters

#### Unit–II

**On Campus**- 'The District School as it Was by One Who Went to it – Warren Burton'; Reading: Identifying Sequence of Ideas;

Grammar&Vocabulary: Cohesive Devices:Linkers/signposts/Transition signals, Synonyms, MeaningsofWords/Phrasesin thecontext; Writing: Memo Drafting.

#### Unit–III

WorkingTogether-'The Future of Work'

Reading: Making basic inferences; Strategies to use text clues for comprehension; Summarizing;Grammar & Vocabulary: Verbs: Tenses; Reporting Verbs for Academic Purpose; Writing: Rephrasing what is read; Avoiding redundancies and repetitions Abstract Writing/Summarizing.

#### Unit–IV

**'A.P.J.AbdulKalam'**; Grammar & Vocabulary: Direct & Indirect Speech; articles and their Omission; Writing :E-Mai IDrafting.

#### Unit–V

**'C.V.Raman'**; Grammar & Vocabulary: Subject-verb Agreement; Prepositions; Writing: Formal Letter Writing.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1		1		1			3	3		2			
CO2		1		1		1			3	3		2			
CO3		1		1		1			3	3		2			
CO4		1		1		1			3	3		2			
CO5		1		1		1			3	3		2			
<b>1</b> - Low							<b>2</b> –M	edium	า			<b>3 -</b> Higl	า		

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

#### **TEXTBOOKS:**

- T1 Prabhavati. Y & etal , "English All Round –Communication Skills for Undergraduate Learners" ,Orient Black Swan, Hyderabad, 2019
- T2 "The Great Indian Scientists" published by Cengage Learning India Pvt. Ltd., Delhi, 2017

#### **REFERENCE BOOKS:**

- **R1** Swan, M., "Practical English Usage", Oxford University Press, 2016.
- **R2** Kumar, Sand Latha, P, "Communication Skills", Oxford University Press, 2018.

- **R3** Rizvi Ashraf M., "Effective Technical Communication", Tata Mc Graw Hill, NewDelhi, 2008.
- **R4** Baradwaj Kumkum, "Professional Communication", I. K. International PublishingHousePvt.Lt., NewDelhi, 2008.
- **R5** Wood, F. T., "Remedial English Grammar", Macmillan, 2007.

#### PART-B

## COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to syllabus	01	18-10-2022	-	TLM2	-
2.	Proposal to Girdle The Earth by Nellie Bly	02	19-10-2022 21-10-2022		TLM2	
3.	Reading: Skimming for main idea ; Scanning for specific information	01	25-10-2022		TLM2	
4.	Content words and Function words	01	26-10-2022		TLM2	
5.	Word forms – verbs; Adjectives & adverbs	01	28-10-2022		TLM2	
6.	Nouns – countable & uncountable, singular and plural nouns Word order in sentences, "Wh" questions	02	01-11-2022 02-11-2022		TLM2	
7.	Writing: Paragraph writing, Paragraph analysis	03	04-11-2022 08-11-2022 09-11-2022		TLM2 TLM6	
No. o	of classes required to comple	te UNIT-I: 1	1	No. of classe	s taken:	

#### UNIT-II:

S. No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
		Required	Completion	Completion	Methods	Weekly
8.	The District School As It Way by One Who Went to it - Warren Burton	03	11-11-2022 15-11-2022 16-11-2022		TLM2	
9.	Identifying sequence of ideas	01	18-11-2022		TLM2	

10.	Cohesive devices: linkers /signposts/transition signals	02	22-11-2022 23-11-2022		TLM2	
11.	Synonyms meanings of words / Phrases in the context	02	25-11-2022 29-11-2022		TLM2	
12.	Essay Writing - Memo drafting	02	30-11-2022 02-12-2023		TLM2 TLM6	
No. d	of classes required to complet	LO	No. of classe	s taken:		

## UNIT-III:

S. No.	Topics to be covered	No. of Classes Require D	Tentative Date of Completion	Actual Date of Completion		Teaching Learning Methods	HOD Sign Weekly
13.		02	06-12-2023			TLM2	
_	The Future of Work		07-12-2023			TLM6	
14.	Making basic inferences, Strategies to uses text clues for comprehension	01	09-12-2022			TLM2	
15.	Verbs :tenses, reporting verbs for academic purpose	02	20-12-2022 21-12-2022			TLM2	
16.	Summarizing rephrasing what is read	01	23-12-2022			TLM2	
17.	avoiding redundancies and repetitions - Abstract Writing	02	27-12-2022 28-12-2022			TLM2 TLM6	
	No. of classes required to co	mplete UN	NIT-III: 08		No. of	f classes tak	en:

## UNIT-IV:

S.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
140.		Required	Completion	Completion	Methods	Weekly
18.	APJ Abdul Kalam	02	30-12-2022 03-01-2023		TLM2 TLM2	
19.	Direct-Indirect speech	02	04-01-2023 06-01-2023		TLM2	
20.	Articles and their omission	02	10-01-2023 11-01-2023		TLM2	
21.	E-mail drafting	03	18-01-2023 20-01-2023 24-01-2023		TLM2 TLM6	
No. o	of classes required to comple	No. of classe	s taken:			

## UNIT-V:

S.	Topics to be covered	No. of	Tentative	Actual	Teaching	HOD

No.		Classes	Date of	Date of	Learning	Sign
		Required	Completion	Completion	Methods	Weekly
			25-01-2023			
22.	C.V.Raman	03	27-01-2023		TLM2	
			31-01-2023			
			01-02-2023			
23.	Subject – Verb agreement	02	03-02-2023		TLM2	
24	Propositions	01	07-02-2023		TIMO	
24.	Frepositions	01			I LIVIZ	
25	Formal Letter Writing	02	08-02-2023		TLM2	
25.		02	10-02-2023		TLM6	
No. o	f classes required to comple	ete UNIT-V:	08	No. of classe	s taken:	

Teaching Learning Methods									
TLM1	M1 Chalk and Talk TLM4 Demonstration (Lab/Field V								
TLM2	РРТ	TLM5	ICT (NPTEL/Swayam Prabha/MOOCS)						
TLM3	Tutorial	TLM6	Group Discussion/Project						

## PART-C

## **EVALUATION PROCESS (R17 Regulation):**

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

#### PART-D

## PROGRAMME OUTCOMES (POs):

	Engineering knowledge: Apply the knowledge of mathematics, science, engineering				
PO 1	fundamentals, and an engineering specialization to the solution of complex				
	engineering problems.				
	Problem analysis: Identify, formulate, review research literature, and analyze				
PO 2	complex engineering problems reaching substantiated conclusions using first				
	principles of mathematics, natural sciences, and engineering sciences.				
	Design/development of solutions: Design solutions for complex engineering				
PO 3	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.				
	Conduct investigations of complex problems: Use research-based knowledge and				
PO 4	research methods including design of experiments, analysis and interpretation of				
	data, and synthesis of the information to provide valid conclusions.				
	Modern tool usage: Create, select, and apply appropriate techniques, resources, and				
PO 5	modern engineering and IT tools including prediction and modelling to complex				
	engineering activities with an understanding of the limitations				
50.0	The engineer and society: Apply reasoning informed by the contextual knowledge to				
PO 6	assess societal, health, safety, legal and cultural issues and the consequent				
	responsibilities relevant to the professional engineering practice				
007	Environment and sustainability: Understand the impact of the professional				
PO 7	engineering solutions in societal and environmental contexts, and demonstrate the				
	Knowledge of, and need for sustainable development				
PO 8	and norms of the orgination practice				
	and norms of the engineering practice.				
PO 9	loader in diverse teams, and in multidisciplinary settings				
	Communication: Communicate offectively on complex engineering activities with the				
	communication. Communicate effectively on complex engineering activities with the				
PO 10	comprehend and write effective reports and design documentation make				
	effective presentations, and give and receive clear instructions				
	Project management and finance: Demonstrate knowledge and understanding of the				
	engineering and management principles and apply these to one's own work as a				
PO 11	member and leader in a team to manage projects and in multidisciplinary				
	environments				
	Life-long learning: Recognize the need for and have the preparation and ability to				
PO 12	engage in independent and life-long learning in the broadest context of technological				
1 0 12	change				
	change.				

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	K. Sridevi	Dr. B. Samrajya Lakshmi	Dr. B. Samrajya Lakshmi	Dr. A. Ramireddy
Signature				



## COURSE HANDOUT

Part-A

PROGRAM	: I B. Tech., I-Sem., ECE-B
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: Differential Equations
L-T-P STRUCTURE	: 3-2-0
COURSE CREDITS	:4
COURSE INSTRUCTOR	: Y. P. C. S. Anil Kumar
COURSE COORDINATOR	: Dr. A. Rami Reddy
PRE-REQUISITES	: None

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The objective of this course is to introduce the first order and higher order differential equations, functions of several variables. The students will also learn solving of first order partial differential equations.

#### **COURSE OUTCOMES (COs)**

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

CO1: Apply first order and first degree differential equations to find orthogonal trajectories.

CO2: Distinguish between the structure and methodology of solving higher order differential equations with constant coefficients.

CO3: Apply various Numerical methods to solve initial value problem.

CO4: Generate the infinite series for continuous functions and investigate the functional dependence. CO5: Solve partial differential equations using Lagrange's method.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	-	-	-	-	-	-	-	1
CO2	3	2	-	2	-	-	-	-	-	-	-	1
CO3	3	2	-	2	-	-	-	-	-	-	-	1
CO4	2	1	-	1	-	-	-	-	-	-	-	1
C05	3	2	-	2	-	-	-	-	-	-	-	1

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

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", 42<sup>nd</sup>Edition, Khanna Publishers, New Delhi, 2012.
- **T2** Dr. B. V. Ramana, "Higher Engineering Mathematics", 1<sup>st</sup>Edition, TMH, New Delhi, 2010.

#### **BOS APPROVED REFERENCE BOOKS:**

- **R1** M. D. Greenberg, "Advanced Engineering Mathematics", 2<sup>nd</sup> Edition, TMH Publications, New Delhi, 2011.
- **R2** Erwin Kreyszig, "Advanced Engineering Mathematics", 8<sup>th</sup> Edition, John Wiley & sons, New Delhi, 2011.
- **R3** W.E. Boyce and R. C. Diprima, "*Elementary Differential Equations*", 7<sup>th</sup> Edition, John Wiley & sons, New Delhi,2011.
- **R4** S. S. Sastry, "*Introductory Methods of Numerical Analysis*" 5<sup>th</sup> Edition, PHI Learning Private Limited, New Delhi, 2012.

## 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, Course Outcomes	1	17/10/2022		TLM1			

## UNIT-I: Differential Equations of First Order and First Degree

S. No.	Topics to be covered	No. of Classes Bogwingd	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Mothods	Learning Outcome	Text Book followed	HOD Sign Weekby
2.	Introduction to UNIT I	1	19/10/2022	Completion	TLM2	CO1	T1,T2	weekiy
3.	Formation of Differential Equations	1	19/10/2022		TLM1	CO1	T1,T2	
4.	Exact DE	1	20/10/2022		TLM1	CO1	T1,T2	
5.			21/10/2022					
	Non-exact DE Type I	2	22/10/2022		TLM1	CO1	T1,T2	
6.			26/10/2022					
	Non-exact DE Type II	2	27/10/2022		TLM1	CO1	T1,T2	
7.			28/10/2022					
	Non-exact DE Type III	2	29/10/2022		TLM1	CO1	T1,T2	
8.	Non-exact DE Type IV	2	31/10/2022		TLM3	CO1	T1,T2	
9.			02/11/2022					
	(Cartesian)	2	03/11/2022		TLM1	CO1	T1,T2	
10.			04/11/2022					
	Orthogonal Trajectories (pola	r) 2	05/11/2022		TLM1	CO1	T1,T2	
11.	Tutorial	1	07/11/2022		TLM3	CO1	T1,T2	
No. of compl	classes required to ete UNIT-I	17			]	No. of classes	taken:	

## **UNIT-II: Higher Order 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
12.	Introduction to UNIT II	1	09/11/2022		TLM2	CO2	T1,T2	
13.	Solving a homogeneous DE	1	10/11/2022		TLM1	CO2	T1,T2	
14.	Finding Particular Integral, P.I for $e^{ax+b}$	1	11/11/2022		TLM1	CO2	T1,T2	
15.	P.I for Cos bx, or sin bx	1	12/11/2022		TLM1	CO2	T1,T2	

16.	P.I for polynomial function	2	14/11/2022 16/11/2022	TLM1	CO2	T1,T2	
17.	P.I for $e^{ax+b}v(x)$	2	17/11/2022 18/11/2022	TLM1	CO2	T1,T2	
18.	P.I for $x^k v(x)$	2	19/11/2022         21/11/2022	TLM1	CO2	T1,T2	
19.	Method of Variation of parameters	2	23/11/2022 24/11/2022	TLM1	CO2	T1,T2	
20.	TUTORIAL 2	1	25/11/2022	TLM3	CO2	T1,T2	
No. of classes required to complete UNIT-II		13			No. of class	es taken:	

## UNIT-III: Numerical solution of Ordinary 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
21.	Introduction to Unit-III	1	28/11/2022		TLM2	CO3	T1,T2	
22.	Taylor's series	2	30/11/2022		TLM1	CO3	T1,T2	
23.	Solution by Taylor's series	2	01/12/2022 02/12/2022		TLM1	CO3	T1,T2	
24.	Picard's Method	1	05/12/2022		TLM1	CO3	T1,T2	
25.	Solution byPicard's Method	2	07/12/2022 08/12/2022		TLM1	CO3	T1,T2	
26.	Revision	2	09/12/2022 10/12/2022		TLM1	CO3	T1,T2	
	I MID E	XAMINA'	<b>TIONS (12-12-</b>	2022 TO 16	12-2022)			
27.	Euler's Method	1	17/12/2022		TLM1	CO3	T1,T2	
28.	Modified Euler's Method	1	19/12/2022					
29.	Solution by Modified Eulers Method	2	21/12/2022 22/12/2022		TLM1	CO3	T1,T2	
30.	Runge- Kutta Method	1	23/12/2022		TLM1	CO3	T1,T2	
31.	Solution by Runge Kutte		24/12/2022					
	Method	2	26/12/200					
32.	TUTORIAL 3	1	28/12/2022		TLM3	CO3	T1,T2	

No. of classes required to complete UNIT-III	18	No. of classes taken:
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S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
33.	Introduction to UNIT IV	1	29/12/2022		TLM1	CO4	T1,T2	
34.	Generalized Mean Value Theorem, Taylor's series	2	30/12/2022 31/12/2022		TLM1	CO4	T1,T2	
35.	Maclaurin's series	1	04/01/2023		TLM1	CO4	T1,T2	
36.	Functions of several variables	2	05/01/2023 06/01/2023		TLM1	CO4	T1,T2	
37.	Jacobians (polar, cylindrical, spherical coordinates)	2	07/01/2023 09/01/2023		TLM1	CO4	T1,T2	
38.	Functional dependence	2	19/01/2021 20/01/2023		TLM1	CO4	T1,T2	
39.	Maxima and Minima of functions of two variables	2	21/01/2023 23/01/2023		TLM1	CO4	T1,T2	
40.	Maxima and Minima of functions of two variables	1	21/01/2023		TLM1	CO4	T1,T2	
41.	TUTORIAL 4	1	25/01/2023		TLM3	CO4	T1,T2	
N	Io. of classes required to complete UNIT-IV		14			No. of class	ses taken:	

## **UNIT-IV: Functions of Several Variables**

## **UNIT-V: 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
42.	Introduction to UNIT V	1	27/01/2023		TLM1	CO5	T1,T2	
43.	Formation of PDE by elimination of arbitrary constants	2	28/01/2023 30/01/2023		TLM1	CO5	T1,T2	
44.	Formation of PDE by elimination of arbitrary functions	2	01/02/2023 02/02/2023		TLM1	CO5	T1,T2	
45.	Solving of PDE	1	03/02/2023		TLM1	CO5	T1,T2	
46.	Lagrange's Method	2	04/02/2023 06/02/2023		TLM1	CO5	T1,T2	
47.	Revision	2	08/02/2023 09/02/2023		TLM1	CO5	T1,T2	
48.	TUTORIAL 5	1	10/04/2021		TLM3	CO5	T1,T2	
No. of classes required to complete UNIT-V		11			No. of clas	ses taken:		

## **Contents beyond the Syllabus**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
49.	Solving of PDE other methods	1	11/02/2023		TLM5	CO5	T1,T2	
	No. of classes	1			No. of clas	sses taken:		
II MID EXAMINATIONS (13-02-2023 TO 17-02-2023)								

Teach	Teaching Learning Methods							
TLM1	Chalk and Talk	TLM5	ICT (NPTEL/Swayam Prabha/MOOCS)					
TLM2	PPT	TLM6	Assignment or Quiz					
TLM3	Tutorial	TLM7	Group Discussion/Project					
TLM4	Demonstration (Lab/Field Visit)							

Part - C

## **EVALUATION PROCESS:**

Evaluation Task	Units	Marks
Assignment-1	1	A1=5
Assignment-2	2	A2=5
I-Mid Examination	1,2,3.5	B1=18
Objective Questions-1	1,2,3.5	C1=7
Assignment- 3	3	A3=5
Assignment-4	4	A4=5
Assignment- 5	5	A5=5
II-Mid Examination	3,4,5	B2=18
Online Quiz-2	3,4,5	C2=7
Evaluation of Assignment: A=Avg (Best of Four(A1,A2,A3,A4,A5))	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=18
Evaluation of Objective Questions Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=7
Cumulative Internal Examination : A+B+C	1,2,3,4,5	30
Semester End Examinations : D	1,2,3,4,5	70
Total Marks: A+B+C+D	1,2,3,4,5	100

Y.P.C.S.Anil Kumar	Dr. A. RAMI REDDY	Dr. A. RAMI REDDY	Dr. A. RAMI REDDY
Course Instructor	Course Coordinator	Module Coordinator	HOD



## FRESHMAN ENGINEERING DEPARTMENT

## **COURSE HANDOUT**

## PART-A

PROGRAM	: B.Tech., I-Sem., ECE-B
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: APPLIED PHYSICS & 20FE07
L-T-P STRUCTURE	: 4-1-0
COURSE CREDITS	3
COURSE INSTRUCTOR	: N. T. SARMA
PRE-REQUISITE	: Basic Knowledge of Physics

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** It enables the students to understand the fundamental concepts of optics, quantum mechanics, free electron theory of metals, semiconductors, dielectrics, and their applications.

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

CO 1	<b>Define</b> the nature of Interference and Diffraction.
CO 2	Apply the Lasers and Optical Fibers in different fields.
CO 3	Estimate the electrical conductivity of metals.
<b>CO 4</b>	Analyze the properties of Semiconducting materials.
CO5	Classify the different types of Magnetic and Dielectric materials.

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

APPLIED PHYSICS												
COURSE DESIGNED BY	FRE	FRESHMAN ENGINEERING DEPARTMENT										
Course Outcomes		Programme Outcomes										
PO's →	1	2	3	4	5	6	7	8	9	10	11	12
CO1.	3	3	1	1	1	1	1	-	-	-	-	1
CO2.	3	3	2	1	1	1	1	-	-	-	-	1
СО3.	3	3	1	1	1	1	1	-	-	-	-	1
CO4.	3	3	1	1	1	1	1	-	-	-	-	1
CO5.	3	3 3 1 1 1 1 1 1										
1 = slight (L)	ow)	2	= Mo	derate	e ( Me	dium)		3 =	Subst	antial (	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., 2<sup>nd</sup> Edition, 2014.

#### **BOS APPROVED REFERENCE BOOKS:**

- **R1** : M.N. Avadhanulu, TVS Arun Murthy, "Applied *Physics*", S. Chand & Co., 2<sup>nd</sup> 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,1<sup>st</sup> Edition, 2016.
- **R4**: Hitendra K Mallik, AK Singh "*Engineering Physics*", TMH, New Delhi, 1<sup>st</sup> 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										
TLM-1	Chalk and Talk	TLM-4	Demonstration (Lab/Field Visit)								
TLM-2	PPT/AV illustrations	TLM-5	ICT (NPTEL/Swayam Prabha/MOOCS)								
TLM-3	Tutorial/Quiz/Assignment	TLM-6	Group Discussion/Project								

#### PART-B

#### COURSE DELIVERY PLAN (LESSON PLAN): INTRODUCTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
	Basic theories of light, Snell's law,						
1.	Properties of transparent and opaque surfaces, Principle of superposition	1	17/10/2022	17/10/2022			
2.	Basic definitions of Magnetism, Classification of magnetic materials,	1	19/10/2022	19/10/2022			

3.	Basic definitions of electricity, charges and their properties, Capacitors and their fundamentals	1	20/10/2022	20/10/2022		
4.	Intrinsic Semiconductors, P Type & N Type Semiconductors, Bias techniques V-I Characteristics Laws of, photoelectric emission	1	21/10/2022	21/10/2022		
5.	Electromagnetic spectrum, Classification of solids	1	22/10/2022	22/10/2022		

## **UNIT-I: INTERFERENCE & DIFFRACTION**

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

S.No.	Topics to be	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD	Remarks
	covereu	Required	Completion	Completion	Methods	Sign	
	Introduction to						
1.	the Subject,	1	26/10/2022	26/10/2022	TLM-2		
	Course Outcomes						
	Superposition of						
	waves,						
2.	Coherence,	1	27/10/2022	27/10/2022	TLM-3		
	Conditions for			_ ,, _ ,, _ , _ , _ , _ ,			
	Interference						
3.	TUTORIAL	1	28/10/2022	28/10/2022	TLM-3		
4	Interference in	1					
т.	thin films	1	29/10/2022	29/10/2022			
5.	Newton's rings	1	31/10/2022	31/10/2022	TLM-4		
6.	Michelson's	1	02/11/2022	02/11/2022	TLM-2		
	interferometer						
	Introduction –		03/11/2022	03/11/2022			
7.	Diffraction, Types	1			TLM-3		
8.	TUTORIAL	1	04/11/2022	04/11/2022	TLM-3		
9	Single slit	1	05/11/2022	05/11/2022	TLM-1		
	diffraction	•					
	Diffraction –		07/11/2022	07/11/2022			
10.	Circular aperture,	1			TLM-4		
	Diffraction						
	grating						

11.	Resolving power of Grating	1	09/11/2022	09/11/2022	TLM-4	
12.	Problems & Assignment/Quiz	1	10/11/2022	10/11/2022	TLM-3	
]	No. of classes require	ed to complete	e UNIT-I: 12	No. of	classes taken:	12

## UNIT-II: LASERS & OPTICAL FIBERS

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

S.No.	Topics to be	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD	Remarks
511101	covered	Required	Completion	Completion	Methods	Sign	
1.	TUTORIAL	1	11/11/2022	11/11/2022	TLM-3		
2.	Principle of laser, Absorption, Spontaneous and Stimulated emission	1	12/11/2022	12/11/2022	TLM-2		
3.	Characteristics of laser light	1	14/11/2022	17/11/2022	TLM-2		
4.	Einstein Coefficients	1	16/11/2022	18/11/2022	TLM-1		
5.	Nd-YAG Laser, He-Ne gas Laser	1	17/11/2022	19/11/2022	TLM-2		
6.	TUTORIAL		18/11/2022	21/11/2022	TLM-3		
7.	Applications of LASERS	1	19/11/2022	23/11/2022	TLM-5		
8.	Problems & Assignment/Quiz	1	21/11/2022	24/11/2022	TLM-3		
9.	Optical Fiber principle, Structure of optical fiber	1	23/11/2022	25/11/2022	TLM-2		
10.	Numerical aperture and Acceptance angle	1	24/11/2022	26/11/2022	TLM-1		
11.	TUTORIAL	1	25/11/2022	28/11/2022	TLM-3		
12.	Types of optical fibers	1	26/11/2022	30/11/2022	TLM-1		
13.	Applications and Advantages of Optical Fibers	1	28/11/2022	01/12/2022	TLM-5		
14.	Problems & Assignment/Quiz	1	30/11/2022	02/12/2022	TLM-3		
No.	of classes required to	o complete U	JNIT-II: 14	No. of a	classes taken	n:	14

#### **UNIT-III: PRICIPLES OF OUANTUM MECHANICS & FREE ELECTRON THEORY**

## 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.	Introduction quantum mechanics, De Broglie hypothesis	1	01/12/2022	03/12/2022	TLM-5		
2.	TUTORIAL	1	02/12/2022	05/12/2022	TLM-3		
3.	Davisson and Germer Experiment, Physical significance of wave function	1	03/12/2022	07/12/2022	TLM-2		
4.	Schrodinger time dependent & independent wave equations	1	05/12/2022	08/12/2022	TLM-1		
5.	Particle in a potential box	1	07/12/2022	09/12/2022	TLM-1		
6.	Eigen function and Eigen values	1	08/12/2022	10/12/2022	TLM-1		
7.	TUTORIAL	1	09/12/2022	17/12/2022	TLM-3		
8.	Problems & Assignment/Quiz	1	10/12/2022	17/12/2022	TLM-3		
9.	MID-1 Examinations	1	12/12/2022				
10.	MID-1 Examinations	1	14/12/2022				
11.	MID-1 Examinations	1	15/12/2022				
12.	MID-1 Examinations	1	16/12/2022				
13.	Classical free electron theory- postulates, Success & Failures	1	19/12/2022	19/12/2022	TLM-2		
14.	Expression for electrical conductivity and drift	1	21/12/2022	21/12/2022	TLM-1		
15.	Fermi-Dirac distribution function- Temperature	1	22/12/2022	22/12/2022	TLM-2		
16	dependence TUTORIAL	1	22/12/2022	22/12/2022	TLM-3		<u> </u>
10.	Classification of Solids on the basis of Band theory	1	24/12/2022	24/12/2022	TLM-6		
18.	Problems & Assignment/Quiz	1	26/12/2022	26/12/2022	TLM-3		
No	b. of classes required to	complete U	NIT-III: 18	No.	of classes ta	ken:	17

## **UNIT-IV : SEMICONDUCTOR PHYSICS**

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 - Classification of semiconductors	1	28/12/2022	28/12/2022	TLM-6		
2.	Conductivity of Intrinsic and Extrinsic semiconductors	1	29/12/2022	29/12/2022	TLM-1		
3.	TUTORIAL	1	30/12/2022	30/12/2022	TLM-3		
4.	Drift and Diffusion Current, Einstein relation	1	31/12/2022	31/12/2022	TLM-2		
5.	Hall Effect and Hall Coefficient	1	02/01/2023	02/01/2023	TLM-5		
6.	Direct and indirect band gap semiconductors	1	04/01/2023	04/01/2023	TLM-2		
7.	Solar Cell, Applications	1	05/01/2023	05/01/2023	TLM-4		
8.	TUTORIAL	1	06/01/2023	06/01/2023	TLM-3		
9.	Problems & Assignment/Quiz	1	07/01/2023	07/01/2023	TLM-3		
No	. of classes required to	o complete U	UNIT-IV: 09	No. of classes	s taken:		09

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

## UNIT-V : MAGNETIC & DIELECTRIC MATERIALS

## Course Outcome :- CO 5; 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, Magnetic parameters	1	09/01/2023	09/01/2023	TLM-3		
2.	Classification of magnetic materials – Dia, para & Ferro	1	11/01/2023	11/01/2023	TLM-6		
3.	Hysteresis loop and its formation	1	12/01/2023	12/01/2023	TLM-2		
4.	Soft & hard Magnetic materials	1	16/01/2023	16/01/2023	TLM-2		
5.	Applications of magnetic materials	1	18/01/2023	18/01/2023	TLM-1		
6.	Problems & Assignment/Quiz	1	19/01/2023	19/01/2023	TLM-3		
7.	TUTORIAL	1	20/01/2023	20/01/2023	TLM-3		
8.	Basic definitions of dielectrics		21/01/2023	21/01/2023	TLM-2		
9.	Expression for Electronic polarization	1	23/01/2023	23/01/2023	TLM-1		

10.	Ionic & Orientation polarization	1	25/01/2023	25/01/2023	TLM-1		
11.	TUTORIAL	1	27/01/2023	27/01/2023	TLM-3		
12.	Local field, Expression for local field	1	28/01/2023	28/01/2023	TLM-1		
13.	Clausius - Mosotti equation	1	30/01/2022	30/01/2022	TLM-2		
14.	Applications of dielectric materials	1	01/02/2023	01/02/2023	TLM-5		
15.	Problems & Assignment/Quiz	1	02/02/2023	02/02/2023	TLM-3		
No.	of classes required to co	omplete UNI	T-V: 15	No. of c	classes taken	:	15

## **Revision Classes**

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.	Revision of Unit-1	1	03/02/2023	03/02/2023	TLM-2		
2.	Revision of Unit-1	1	04/02/2023	04/02/2023	TLM-2		
3.	Revision of Unit-2	1	06/02/2023	06/02/2023	TLM-2		
4.	Revision of Unit-2	1	08/02/2023	08/02/2023	TLM-2		
5.	Revision of Unit-3	1	09/02/2023	09/02/2023	TLM-2		
6.	Revision of Unit-3	1	10/02/2023	10/02/2023	TLM-2		
7.	Revision of Unit-4	1	11/02/2023	11/02/2023	TLM-2		
8.	MID-2 Examinations	1	13/02/2023				
9.	MID-2 Examinations	1	15/02/2023				
10.	MID-2 Examinations	1	16/02/2023				
11.	MID-2 Examinations	1	17/02/2023				
No.	of classes required for I	Revision: 07	-	No. of c	classes taken	:	07

# PART-C EVALUATION PROCESS (R-20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & III (A))	A-1 = 5
I-Mid Examination (Units-I, II & III (A))	M-1 = 15
I-Quiz Examination (Units-I, II & III (A))	Q-1 = 10
Assignment-III (Units-III (B), IV & V)	A-2 = 5
II-Mid Examination (Units-III (B), IV & V)	M-2 = 15
II-Quiz Examination (Units-III (B), IV & V)	Q-2 = 10
Assignment Marks = Best of A1 & A2	A = 5
Mid Marks = 80% of Max (M-1, M-2) + 20% of Min (M-1, M-2)	M = 15
Quiz Marks = 80% of Max (Q-1, Q-2) + 20% of Min (Q-1, Q-2)	Q = 10
Cumulative Internal Examination (CIE) : A+M+Q	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

#### PART-D

## **PROGRAMME OUTCOMES (POs):**

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

Course Instructor Course Coordinator Module Coordinator HOD

N. T. SARMA

P.V.SIRISHA

DR. S. YUSUB

DR. A. RAMI REDDY

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)



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## **DEPARTMENT OF ECE**

## **COURSE HANDOUT**

## PART-A

Name of Course Instructor: Mr. G.Venkata Rao

Course Name & Code L-T-P Structure Program/Sem/Sec : BASIC ELECTRICAL ENGINEERING-20EE01 Regulation: R20 : 3-0-0 Credits: 3 : B.Tech. I-Sem., ECE B Sec A.Y.: 2022-23

#### **PREREQUISITE:**

## **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

This course deals with nature of basic electrical components, analysis of steady state and transient response of linear electrical networks. It also deals with the principle of operation of AC and DC machines.

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

CO1	Illustrate the behavior of active and passive components, series and parallel circuits, self and mutual inductance of magnetic circuits, network functions and two port networks using circuit and mathematical approaches.
CO2	Interpret the working principles of electrical machines along with grounding and earthing using electrical engineering fundamentals and mathematical approaches.
CO3	Apply mesh analysis, nodal analysis, and network theorems to solve the Thevinen's voltage, Norton's current and maximum power transfer of the linear circuits.
CO4	Analyze the concepts of bandwidth, quality factor of series and parallel resonant circuits using circuit and mathematical approaches.

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
C01	2	1	0	0	0	0	0	0	0	1	0	0	1		1
CO2	2	1	1	1	0	0	0	0	0	1	0	0			
CO3	3	3	1	1	0	0	0	0	0	1	0	0	1		2
CO4	3	2	1	1	0	0	1	0	0	1	0	0	2		2
		1	- Low			2	-Med	ium			3	- High			

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

#### **TEXTBOOKS:**

- T1 Ravish R Singh, "Network Analysis and synthesis", Tata McGraw Hill Pvt Ltd, New Delhi.2013
- T2 B.L Theraja, A.K. Theraja, "Electrical Technology in S.I. UNITS. Volume II. AC & DC MACHINES" Published by S. Chand & Company Ltd 2016.

#### **REFERENCE BOOKS:**

- **R1** M.S Naidu and S. Kamakshaiah, "Introduction to Electrical Engineering", TMH Publication, 3<sup>rd</sup> edition 2017.
- **R2** A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7<sup>th</sup> Edition, New Delhi 2017.

## PART-B

## COURSE DELIVERY PLAN (LESSON PLAN): ECE A Sec

## UNIT-I: Electrical Circuit Fundamentals

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 Basic definitions	1	17-10-22		T1,R1		
2.	Active and Passive Elements	1	18-10-22		T1,R1		
3.	Independent and Dependent Sources	1	19-10-22		T1,R1		
4.	Ohm's Law and Kirchhoff's Laws	1	19-10-22		T1,R1		
5.	Series and Parallel Connection	1	20-10-22		T1,R1		
6.	Star to Delta & Delta to Star Transformations	1	25-10-22		T1,R1		
7.	Source Transformations	1	26-10-22		T1,R1		
8.	Mesh Analysis and Problems	1	26-10-22		T1,R1		
9.	Super mesh Analysis	1	27-10-22		T1,R1		
10.	Node analysis and Problems	1	31-10-22		T1,R1		
11.	Super node Analysis	1	01-11-22		T1,R1		
12.	Duality and Dual networks.	1	02-11-22		T1,R1		
13.	Assignment-1	1	02-11-22		T1,R1		
No.	No. of classes required to complete UNIT-I: 13 No. of classes taken: 13						

#### **UNIT-II: MAGNETIC CIRCUITS & AC FUNDAMENTALS**

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.	Self and mutual inductance	1	03-11-22	•	T1,R1	¥
15.	Coefficient of Coupling, Dot Convention	1	07-11-22		T1,R1	
16.	Series and Parallel Inductance Circuits	1	09-11-22		T1,R1	
17.	Coupled circuits	1	09-11-22		T1,R1	
18.	R.M.S, Average Instantaneous Values, Phase and Phase Difference	1	10-11-22		T1,R1	
19.	Behavior of R, L and C Circuits.	1	14-11-22		T1,R1	
20.	Behavior of RL Series Circuit	1	15-11-22		T1,R2	
21.	Behavior of RC Series Circuit	1	16-11-22			
22.	Behavior of Series RLC Circuit	1	16-11-22		T1,R1	
23.	Behavior of Parallel RLC Circuit	1	17-11-22		T1,R1	
24.	Reactance and Susceptance	1	21-11-22		T1,R1	
25.	Impedance and Admittance	1	22-11-22		T1,R2	
26.	Real Power, Reactive Power, Apparent Power and Power Factor	1	23-11-22		T1,R1	
27.	Assignment-2	1	23-11-22		T1,R1	
No.	of classes required to complete	14	No. of clas	sses take	n: 14	

#### **UNIT-III: NETWORK THEOREMS & RESONANCE CIRCUITS**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
28.	Introduction	1	24-11-22		T1,R1	

	No. of classes required to comp	No. of classes take	n:11		
38.	Assignment-3	1	08-12-22	T1,R1	
37.	Band Width & Quality Factor	1	07-12-22	T1,R1	
36.	Parallel Resonant Circuit	1	07-12-22	T1,R1	
35.	Series Resonant Circuit	1	06-12-22	T1,R1	
34.	Millman's Theorem	1	05-12-22	T1,R1	
33.	Reciprocity Theorem	1	01-12-22	T1,R1	
32.	Maximum Power Transfer Theorem	1	30-11-22	T1,R1	
31.	Norton's Theorem	1	30-11-22	T1,R1	
30.	Thevenin's Theorem	1	29-11-22	T1,R1	
29.	Superposition Theorem	1	28-11-22	T1,R1	

#### UNIT-IV: NETWORK FUNCTIONS & TWO PORT NETWORKS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
39.	Driving point and transfer functions	1	19-12-22		T1,R1		
40.	Poles and zeros of network functions	1	20-12-22		T1,R1		
41.	Restrictions of pole and zero locations	1	21-12-22		T1,R1		
42.	Driving point and transfer functions	1	21-12-22		T1,R1		
43.	Z, Y Parameters	1	22-12-22		T1,R1		
44.	ABCD & h-parameters	1	26-12-22		T1,R1		
45.	Inter-relationship between parameters	1	27-12-22		T1,R1		
46.	Series, Parallel and Cascade Connections	1	28-12-22		T1,R1		
47.	Assignment-4	1	28-12-22		T1,R1		
No.	No. of classes required to complete UNIT-IV: 09 No. of classes taken:09						

## **UNIT-V: ELECTRICAL MACHINES**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
48.	Generator principle, Types of Generators	1	29-12-22		T1,R1	
49.	E.M.F Equation of a Generator	1	02-01-23		T1,R1	
50.	Motor principle, Significance of back e.m.f	1	03-01-23		T1,R1	
51.	Voltage equation of a motor	1	04-01-23		T1,R1	
52.	Brake Test on the DC shunt motor	1	04-01-23		T1,R1	
53.	Working principle of Transformer	1	05-01-23		T1,R1	
54.	Ideal Transformer and E.M.F Equation of a Transformer	1	09-01-23		T1,R1	
55.	Transformer Tests (OC and SC)	1	10-01-23		T1,R1	
56.	Electrical Safety: Definitions and precautions	1	11-01-23		T1,R1	
57.	Concepts of grounding and earthing	1	11-01-23		T1,R1	
58.	Assignment-V	1	12-01-23		T1,R1	
No. of classes required to complete UNIT-V: 11 No. of classes taken:11						n:11

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

## PART-D

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):**

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

## **PROGRAMME OUTCOMES (POs):**

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

	engineering solutions in societal and environmental contexts, and demonstrate the
	knowledge of, and need for sustainable development
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities
	and norms of the engineering practice
PO 9	Individual and team work: Function effectively as an individual, and as a member or
	leader in diverse teams, and in multidisciplinary settings
PO 10	Communication: Communicate effectively on complex engineering activities with
	the engineering community and with society at large, such as, being able to
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	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
PROGRA	MME SPECIFIC OUTCOMES (PSOs):
DSO 1	Design and develop modern communication technologies for building the inter-

PSO 1	Design and develop modern communication technologies for building the inter									
	disciplinary skills to meet current and future needs of industry									
<b>PSO 2</b>	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									
<b>PSO 3</b>	Apply the Signal processing techniques to synthesize and realize the issues related to									
	real time applications									

<b>Course Instructor</b>	<b>Course Coordinator</b>	Module Coordinator	Head of the Department
Mr.G.Venkata Rao	Ch.Mallikarjuna Rao	Dr. G. Srinivasulu	Dr. Y. Amar Babu

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Phone: 08659-222933, Fax: 08659-222931

## **DEPARTMENT OF ECE**

## COURSE HANDOUT

## PART-A

Name of Course Instructor: K. RANI RUDRAMA

Course Name & Code : EDC Lab-20EC51Regulation: R20L-T-P Structure: 0-0-3Credits: 1.5Program/Sem/Sec: B. Tech. I-Sem., ECE- B SecA.Y.: 2022-23

PREREQUISITE: Nil

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**: This course introduces the characteristics and applications of semiconductor devices; emphasis is placed on characteristics and testing practically to strengthen the knowledge.

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

<b>CO1</b>	Demonstrate the characteristics of Diodes, BJT, FET, Voltage regulators, Diode
01	applications
602	Analyze the device parameters of Diodes, Bipolar Junction Transistors, and Field Effect
02	Transistors for its electrical parameters using VI characteristics
<u> </u>	Apply the knowledge of diodes, Capacitors and transistors for the realization of
CO3	rectifiers, regulators, Clippers and Clampers circuits
CO4	Adapt effective Communication, presentation and report writing skills

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

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	1	-
CO2	3	1	-	-	-	-	-	-	-	-	1	1	-	2	-
CO3	3	1	1	-	-	-	-	-	-	-	-	-	-	2	-
CO4	-	-	-	-	-	-	-	-	3	2	-	-	-	-	-
<b>1 -</b> Low						2 – Medium			<b>3 -</b> High						

#### **TEXTBOOKS:**

**T1** Jacob Millman, Christos C Halkias, Electronic Devices and Circuits, Third edition, Tata McGraw Hill, Publishers, New Delhi. 2012

#### **REFERENCE BOOKS:**

**R1** Ben Streetman and Sanjay Banerjee, Solid State Electronic Devices, Fourth edition, Prentice Hall Publishers, 2014

## PART-B

## COURSE DELIVERY PLAN (LESSON PLAN): BATCH-1

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.	COs, Identification of components, Active and Passive Devices, Study and operation of Regulated Power Supplies, CRO and Function generators	3	01.11.2022			
2.	Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode using Characteristics	3	08.11.2022			
3.	Realization and performance evaluation of Half wave rectifier with and without Capacitor filter	3	15.11.2022			
4.	Realization and performance evaluation of Full wave rectifier with and without Capacitor filter	3	22.11.2022			
5.	Analysis of Transistor CB Configuration for its Input and Output resistances and Current gains using VI Characteristics	3	29.11.2022			
6.	Analysis of Transistor CE Configuration for its Input and Output resistances and Current gains using VI Characteristics	3	06.12.2022			
7.	Analysis of Drain and Transfer Characteristics of Field Effect Transistor for its Drain Resistance, Transconductance and Amplification factor	3	20.12.2022			
8.	Determination of Breakdown voltage of Zener diode and Design of Zener Voltage regulator	3	27.12.2022			
9.	Design and Realization of Series Voltage Clippers with and without bias voltage	3	03.01.2023			
10.	Design and Realization of Shunt Voltage Clippers with and without bias voltage	3	17.01.2023			
11.	Design and Realization of Voltage Clampers circuits using Diode and capacitors	3	24.01.2023			
12.	Realization of Voltage multiplier using Clampers.	3	31.01.2023	No of classe	s taken:	
# PART-B

# COURSE DELIVERY PLAN (LESSON PLAN): BATCH-2

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.	COs, Identification of components, Active and Passive Devices, Study and operation of Regulated Power Supplies, CRO and Function generators	3	03.11.2022			
2.	Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode using Characteristics	3	10.11.2022			
3.	Realization and performance evaluation of Half wave rectifier with and without Capacitor filter	3	17.11.2022			
4.	Realization and performance evaluation of Full wave rectifier with and without Capacitor filter	3	24.11.2022			
5.	Analysis of Transistor CB Configuration for its Input and Output resistances and Current gains using VI Characteristics	3	01.12.2022			
6.	Analysis of Transistor CE Configuration for its Input and Output resistances and Current gains using VI Characteristics	3	08.12.2022			
7.	Analysis of Drain and Transfer Characteristics of Field Effect Transistor for its Drain Resistance, Transconductance and Amplification factor	3	22.12.2022			
8.	Determination of Breakdown voltage of Zener diode and Design of Zener Voltage regulator	3	29.12.2022			
9.	Design and Realization of Series Voltage Clippers with and without bias voltage	3	05.01.2023			
10.	Design and Realization of Shunt Voltage Clippers with and without bias voltage	3	19.01.2023			
11.	Design and Realization of Voltage Clampers circuits using Diode and capacitors	3	26.01.2023			
12.	Realization of Voltage multiplier using Clampers. of classes required to complete • 24	3	02.02.2023	No. of classe	s taken:	

Teaching Learning Methods								
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)					
TLM2	РРТ	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 $= \mathbf{A}$	1,2,3,4,5,6,7,8	A=05
Record $=$ <b>B</b>	1,2,3,4,5,6,7,8	B=05
Internal Test = $\mathbf{C}$	1,2,3,4,5,6,7,8	C = 05
Cumulative Internal Examination : A + B + C = 15	1,2,3,4,5,6,7,8	15
Semester End Examinations = D	1,2,3,4,5,6,7,8	<b>D</b> = 35
Total Marks: $A + B + C + D = 50$	1,2,3,4,5,6,7,8	50

# PART-D

# PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

<b>PEO 1</b>	To Attain a solid foundation in Electronics & Communication Engineering
	fundamentals with an attitude to pursue continuing education
PEO 2	To Function professionally in the rapidly changing world with advances in technology
<b>PEO 3</b>	To Contribute to the needs of the society in solving technical problems using
	Electronics & Communication Engineering principles, tools and practices
<b>PEO 4</b>	To Exercise leadership qualities, at levels appropriate to their experience, which
	addresses issues in a responsive, ethical, and innovative manner?
PROGR/	AMME OUTCOMES (POs):
PO 1	<b>Engineering knowledge</b> : 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	<b>Design/development of solutions</b> : 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
1	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						
DO 7	Tesponsionities relevant to the professional engineering practice						
P0 7	<b>Environment and sustainability</b> : 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						
PROGRA	MME SPECIFIC OUTCOMES (PSOs):						

<b>PSO 1</b>	Design and develop modern communication technologies for building the inter
	disciplinary skills to meet current and future needs of industry
<b>PSO 2</b>	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
<b>PSO 3</b>	Apply the Signal processing techniques to synthesize and realize the issues related to
	real time applications

K.RaniRudrama Course Instructor Dr.G.Srinivasulu Course Coordinator Dr.G.Srinivasulu Module Coordinator Dr.Y.AmarBabu HOD LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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# **DEPARTMENT OF COMPUTER SCIENCE ENGINEERING**

# **COURSE HANDOUT**

# PART-A

Name of Course Instructor: Ms. K. SRIDEVI

LAB, 20FE51
2
–B- I SEM
2-23

Credits: 01

PREREQUISITE: NIL

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**: To improve the proficiency of students in English with an emphasis on better communication in formal and informal situations; Develop speaking skills required for expressing their knowledge and abilities and to face interviews with confidence.

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

C01	Introduce one-self and others using appropriate language and details.	L2
CO2	Comprehend short talks and speak clearly on a specific topic using	L2
CO3	Report effectively after participating in informal discussions ethically.	L1
<b>CO4</b>	Interpret data aptly, ethically & make oral presentations without	L3

# Syllabus: Professional Communication Lab (PCS) shall have two parts:

- Computer Assisted Language Learning (CALL) Lab for 60 students with 60 systems, LAN facility and English language software for self-study by learners.
- Interactive Communication Skills (ICS) Lab. with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo – audio & video system and camcorder etc.

## Exercise-I

CALL Lab: Understand- Sentence structure.

**ICS Lab: Practice** -Listening: Identifying the topic, the context and specific information, Speaking: Introducing oneself and others.

## Exercise-II

CALL Lab: Understand- Framing questions.

Speaking: Discussing in pairs/small groups on specific topics; Delivering short structured talks using suitable cohesive devices (JAM)

## Exercise-III

CALL Lab: Understand- Comprehension practice–Strategies for Effective Communication

**ICS Lab: Practice** - Listening: Listening for global comprehension and Summarizing Speaking: Discussing specific topics in pairs/small groups, reporting what is discussed

## Exercise-IV

**CALL Lab: Understand-** Features of Good Conversation–Strategies for Effective Communication.

**ICS Lab: Practice** -Listening: making predictions while listening to conversations/transactional dialogues with/without video Speaking: Role – plays – formal & informal – asking for and giving information/directions/instructions/suggestions

## Exercise-V

CALL Lab: Understand- Features of Good Presentation, Methodology of Group Discussion

ICS Lab: Practice –Introduction to Group Discussions.

Listening: Answering questions, identifying key terms and understanding concepts.

Speaking: Formal Oral & Poster presentations on topics from academic contexts without the use of PPT.

## Lab Manual:

1. Prabhavati .Y & etal, "English All Round–Communication Skills for Undergraduate Learners", Orient Black Swan, Hyderabad, 2019.

## Suggested Software:

- 1. Digital Mentor: Globarena, Hyderabad, 2005
- 2. Sky Pronunciation Suite: Young India Films, Chennai, 2009
- 3. Mastering English in Vocabulary, Grammar, Spelling, Composition, Dorling Kindersley, USA, 2001
- 4. Dorling Kindersley Series of Grammar, Punctuation, Composition, USA, 2001
- 5. Oxford Talking Dictionary, The Learning Company, USA, 2002
- 6. Learning to Speak English- 4CDs. The Learning Company, USA, 2002
- 7. Cambridge Advanced Learners English Dictionary (CD).Cambridge University Press, New Delhi, 2008.

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

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

# COURSE DELIVERY PLAN (LESSON PLAN):

# UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly			
1.	Introduction to syllabus	02	17-10-2022		TLM4				
2.	Self Introduction & Introducing others	02	31-10-2022		TLM4				
3.	Self Introduction & Introducing others	02	07-11-2022		TLM4				
4.	JAM- I(Short and Structured Talks)	02	14-11-2022		TLM4				
5.	JAM-II(Short and Structured Talks)	02	21-11-2022 28-11-2022		TLM4				
6.	Role Play-I(Formal and Informal)	04	05-12-2022		TLM4				
7.	Role Play-II (Formal and Informal)	02	19-12-2022		TLM4				
8.	Group Discussion-I (Reporting the discussion)	02	26-12-2023 02-01-2023		TLM4, TLM6				
9.	Group Discussion-II	02	09-01-2023		TLM4, TLM6				
10.	Oral & Poster Presentation	02	23-01-2023 30-01-2023		TLM2, TLM4				
11.	Lab Internal Exam	02	06-02-2023						
No.	No. of classes required to complete Syllabus: 24 No. of classes taken:								

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

# PART-C

# **EVALUATION PROCESS (R20 Regulation):**

Evaluation Task	Marks
Cumulative Internal Examination (CIE): M	<mark>15</mark>
Semester End Examination (SEE)	<mark>35</mark>
Total Marks = CIE + SEE	50

# **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.
	<b>Problem analysis:</b> Identity, formulate, review research literature, and analyze complex engineering
PO 2	problems reaching substantiated conclusions using first principles of mathematics, natural sciences,
	and engineering sciences.
00.2	Design/development of solutions: Design solutions for complex engineering problems and design
PU 3	system components or processes that meet the specified needs with appropriate consideration for the
	public nealth and safety, and the cultural, societal, and environmental considerations.
DO 4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods
PO 4	including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
	to provide valid conclusions.
DO E	angineering and IT tools including prediction and modelling to complex engineering activities with an
FUJ	understanding of the limitations
	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal
PO 6	health safety legal and cultural issues and the consequent responsibilities relevant to the professional
	engineering practice
	<b>Environment and sustainability</b> : Understand the impact of the professional engineering solutions in
PO 7	societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable
	development
<b>DO 0</b>	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the
PO 8	engineering practice.
<b>DO 0</b>	Individual and team work: Function effectively as an individual, and as a member or leader in diverse
PO 9	teams, and in multidisciplinary settings.
	Communication: Communicate effectively on complex engineering activities with the engineering
PO 10	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
	Project management and finance: Demonstrate knowledge and understanding of the engineering and
PO 11	management principles and apply these to one's own work, as a member and leader in a team, to
	manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in
	independent and life-long learning in the broadest context of technological change.

	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Ms. K. Sridevi	Dr. B. Samrajya Lakshmi	Dr. B. Samrajya Lakshmi	Dr. A. Ramireddy
Signature				



## Part-A

PROGRAM	:	B.Tech., I-Sem., ECE-B
ACADEMIC YEAR	:	2022-23
COURSE NAME & CODE	:	APPLIED PHYSICS LAB & 20FE54
L-T-P STRUCTURE	:	0-0-3
COURSE CREDITS	:	1.5
<b>COURSE INSTRUCTOR</b>	:	N. T. SARMA / Dr. P.V.N KISORE
COURSE COORDINATOR	:	Dr. S. YUSUB

Pre-requisites : Nil

**Course Educational Objective:** This course enables the students to acquire theoretical ideas, analytical techniques, and graphical analysis, by completing a host of experiments with the procedures and observational skills for appropriate use of simple and complex apparatus.

**Course Outcomes:** At the end of the course, the student will be able to:

- **CO 1:** Analyse the wave characteristics of light.
- **CO 2:** Estimate the magnetic field using Stewart's and Gee's apparatus.
- **CO 3:** Verify the characteristics of semiconductor diodes.
- **CO 4:** Determine the acceptance angle and numerical aperture of optical fibre.
- **CO 5:** Improve report writing skills and individual teamwork with ethical values.

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

Applied Physics Lab												
COURSE	FRESHMAN ENCINEEDING DEPARTMENT											
DESIGNED BY		Г	KE SI			GIN		NG DI				
<b>Course Outcomes</b>					Prog	gramn	ne Ou	tcom	es			
PO's →	1	2	3	4	5	6	7	8	9	10	11	12
CO1.	3	3	1	1								1
CO2.	3	3	1	1								1
CO3.	3	3	1	1								1
CO4.	3	3	1	1								1
CO5.								2	2	2		

## **BOS APPROVED TEXT BOOKS:**

1. Lab Manual Prepared by the LBRCE.

#### Part-B

## COURSE DELIVERY PLAN (LESSON PLAN): CSE – B

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
1.	Introduction to Physics Lab	3	21/10/2022	21/10/2022	TLM4	CO1, CO2, CO3, CO4	T1	
2.	Demonstration	3	28/10/2022	28/10/2022	TLM4	CO1, CO2, CO3, CO4	T1	
3.	Experiment 1	3	04/11/2022	04/11/2022	TLM4	CO1, CO2, CO3, CO4	T1	
4.	Experiment 2	3	11/11/2022	11/11/2022	TLM4	CO1, CO2, CO3, CO4	T1	
5.	Experiment 3	3	18/11/2022	18/11/2022	TLM4	CO1, CO2, CO3, CO4	T1	
6.	Experiment 4	3	25/11/2022	25/11/2022	TLM4	CO1, CO2, CO3, CO4	T1	
7.	Experiment 5	3	02/12/2022	02/12/2022	TLM4	CO1, CO2, CO3, CO4	T1	
8.	Demonstration	3	09/12/2022	09/12/2022	TLM4	CO1, CO2, CO3, CO4	T1	
9.	Experiment 6	3	23/12/2022	23/12/2022	TLM4	CO1, CO2, CO3, CO4	T1	
10.	Experiment 7	3	30/12/2022	30/12/2022	TLM4	CO1, CO2, CO3, CO4	T1	
11.	Experiment 8	3	06/01/2023	06/01/2023	TLM4	CO1, CO2, CO3, CO4	T1	
12.	Experiment 9	3	20/01/2023	20/01/2023	TLM4	CO1, CO2, CO3, CO4	T1	
13.	Experiment 10	3	27/01/2023	27/01/2023	TLM4	CO1, CO2, CO3, CO4	T1	
14.	Internal Exam	3	03/02/2023	03/02/2023				
15.	Internal Exam	3	10/02/2023	10/02/2023				
No. of to d	classes required complete lab		13			No. of classe	es taken: 15	

# **EVALUATION PROCESS:**

Evaluation Task	Expt. no's	Marks
Day to Day work = $\mathbf{A}$	1,2,3,4,5,6,7,8,9,10	A = 05
Internal test = $\mathbf{B}$	1,2,3,4,5,6,7,8,9,10	B = 05
Evaluation of viva voce = $\mathbf{C}$	1,2,3,4,5,6,7,8,9,10	C = 05
Cumulative Internal Examination : A + B + C = 15	1,2,3,4,5,6,7,8,9,10	15
Semester End Examinations = D	1,2,3,4,5,6,7,8,9,10	<b>D</b> = 35
Total Marks: $A + B + C + D = 50$	1,2,3,4,5,6,7,8,9,10	50

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

(9). Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

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

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

Course Instructor

**Course Coordinator** 

Module Coordinator H.O.D

N. T. SARMA

P.V. SIRISHA

Dr. S. YUSUB Dr. A. RAMIREDDY

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# **DEPARTMENT OF ECE**

# **COURSE HANDOUT**

# PART-A

Name of Course Instructor	r: Mr.G.Venkata Rao/ Mr. Ch.Mallikarjuna Rao/Mr.K.V.	Ashok
Course Name & Code	: Basic Electrical Engineering Lab- 20EE51	Regulation:R20
L-T-P Structure	: 0-0-3	<b>Credits:</b> 1.5
Program/Sem/Sec	: B.Tech., ECE., I-Sem., Section-B	<b>A.Y.:</b> 2022-23

## **PREREQUISITE:**

## **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

This is a course to expose basic circuit concepts, circuit modeling and methods of circuit analysis in time domain and frequency domain for solving simple circuits including DC and AC circuit theory and network theorems.

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

CO1	Interpret the behavior inductance of magnetic circuits, two port networks and principle of electrical machines using fundamental electrical laws and mathematical models
CO2	Apply Kirchhoff's laws, Network theorems to verify the linear electrical circuits using fundamental electrical laws and mathematical equations.
CO3	Summarize the active & reactive powers of single-phase electrical circuits and resonant frequency, bandwidth & quality factor of electrical circuits.
CO4	Adapt effective communication, presentation and report writing.

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

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
C01	3	2	1	1						2			0	0	2
CO2	3	3	1	1						2			0	0	2
CO3	3	2	1	1						2			0	0	3
C04									2	3			0	0	0
	<b>1</b> - Low <b>2</b> - Medium <b>3</b> - High														

#### **TEXTBOOKS:**

- **T1** Ravish R Singh, "Network Analysis and synthesis", Tata McGraw Hill Pvt Ltd, New Delhi.2013
- **T2** B.L Theraja, A.K. Theraja, "Electrical Technology in S.I. UNITS. Volume II. AC & DC MACHINES" Published by S. Chand & Company Ltd 2016.

#### **REFERENCE BOOKS:**

- **R1** M.S Naidu and S. Kamakshaiah, "Introduction to Electrical Engineering", TMH Publication, 3<sup>rd</sup> edition 2017.
- **R2** A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7<sup>th</sup> Edition, New Delhi 2017.

# PART-B

# COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
1.	Introduction to basic components	3	25/10/22				
2.	Kirchhoff's laws	3	01/11/22				
3.	Voltage & Current division rules	3	08/11/22				
4.	Superposition theorem	3	15/11/22				
5.	Thevenin's & Norton's theorem	3	22/11/22				
6.	Maximum power transfer theorem	3	29/11/22				
7.	Resonant frequency, Bandwidth and Quality factor of series RLC circuit	3	06/12/22				
8.	Resonant frequency, Bandwidth and Quality factor of parallel RLC circuit	3	20/12/22				
9.	Z & Y-Parameters of two port network	3	27/12/22				
10.	Efficiency of DC shunt motor	3	03/01/22				
11.	Determination of critical resistance and critical speed of DC shunt generator	3	10/01/23				
12.	Revision	3	24/01/23 & 31/01/23				
13.	Internal Lab Examination	3	07/02/23				
No.	No. of classes required to complete : 10 No. of classes taken:						

## **COURSE DELIVERY PLAN (LESSON PLAN):**

S. No.	Topics to be covered. (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
1.	Introduction to basic components	3	27/10/22				
2.	Kirchhoff's laws	3	03/11/22				
3.	Voltage & Current division rules	3	10/11/22				
4.	Superposition theorem	3	17/11/22				
5.	Thevenin's & Norton's theorem	3	24/11/22				
6.	Maximum power transfer theorem	3	01/12/22				
	Resonant frequency, Bandwidth		00/10/00				
7.	and Q- factor of series RLC circuit	3	08/12/22				
	Resonant frequency, Bandwidth						
8.	and Quality factor of parallel	3	22/12/22				
	RLC circuit						
9.	Z & Y-Parameters of two port	3	29/12/22				
	networks						
10.	Efficiency of DC shunt motor	3	05/01/23				
11.	Determination of critical	3	12/01/23				
	resistance and critical speed of						
	DC shunt generator						
12.	Revision		19/01/23				
13.	Internal Lab Examination	3	02/02/23				
No.	No. of classes required to complete: 10 No. of classes taken:						

Teaching	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 $= \mathbf{A}$	1,2,3,4,5,6,7,8	A=05
Record $=$ <b>B</b>	1,2,3,4,5,6,7,8	B=05
Internal Test = $\mathbf{C}$	1,2,3,4,5,6,7,8	C = 05
Cumulative Internal Examination : A + B + C = 15	1,2,3,4,5,6,7,8	15
Semester End Examinations = D	1,2,3,4,5,6,7,8	D = 35
Total Marks: $A + B + C + D = 50$	1,2,3,4,5,6,7,8	50

# PART-D

# PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

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

# **PROGRAMME OUTCOMES (POs):**

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering						
	fundamentals, and an engineering specialization to the solution of complex						
	engineering problems						
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze						
	complex engineering problems reaching substantiated conclusions using first						
	principles of mathematics, natural sciences, and engineering sciences						
PO 3	<b>Design/development of solutions</b> : 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	<b>Environment and sustainability</b> : 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):**

<b>PSO 1</b>	Design and develop modern communication technologies for building the inter						
	disciplinary skills to meet current and future needs of industry						
<b>PSO 2</b>	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						
<b>PSO 3</b>	Apply the Signal processing techniques to synthesize and realize the issues related to						
	real time applications						

Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Mr. G.Venkata Rao	Mr.G.Venkata Rao	Dr. G. Srinivasulu	Dr. Y. Amar Babu

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# **DEPARTMENT OF ECE**

# **COURSE HANDOUT**

# PART-A

Name of Course Instructor: Dr. T. Satyanarayana, ProfessorCourse Name & Code: EDC-20EC01L-T-P Structure: 3-0-0Program/Sem/Sec: B. Tech. I-Sem., ECE A Sec

**Regulation**: R20 **Credits:** 03 **A.Y.:** 2022-23

PREREQUISITE: Fundamentals of Physics

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**: This course introduces the Device construction, characteristics and applications of semiconductor devices like PN junction diode, Bipolar Junction Transistor (BJT), Field Effect Transistor (FET), Metal oxide Semiconductor Field Effect Transistor (MOSFET) and various special devices.

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

-	
CO1	Identify the types of Diodes, Transistors, FETs, Biasing techniques and their
	comparisons to select the best approaches for designing the electronic circuits
	using Devices and components
CO2	Interpret the mathematical models of Currents & Voltages of Diodes, Bipolar
	Junction Transistors and Field Effect Transistors and biasing of BJT and FET
	using fundamental circuits
CO3	Apply the knowledge of diodes, transistors and filters for designing the
	rectifiers, Filters, Regulators and Amplifier circuits using Devices and
	components
CO4	Analyze the characteristics of Diodes, Bipolar Junction Transistors, Field
	Effect Transistors and their equivalent models using VI Characteristics and
	mathematical models

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

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
C01	2	3	1	-	-	3	1	-	-	-	1	2	1	1	-
CO2	2	1	2	1	-	3	1	-	-	-	-	1	1	1	-
CO3	3	1	1	-	-	-	1	-	-	-	-	-	2	2	-
CO4	1	3	-	-	-	-	-	-	-	-	1	1	2	2	-
<b>1</b> - Low					2	-Medi	ium			3	- High				

## **TEXTBOOKS:**

- **T1** Jacob Millman, Christos C Halkias, Electronic Devices and Circuits, Third edition, Tata McGraw Hill, Publishers, New Delhi. 2012
- **T2** Boylestad R.L. and Louis Nashelsky, Electronic Devices and Circuits, Fourth edition, Pearson/Prentice Hall Publishers, 2014

## **REFERENCE BOOKS:**

**R1** Ben Streetman and Sanjay Banerjee, Solid State Electronic Devices, Fourth edition, Prentice Hall Publishers, 2014

# **COURSE DELIVERY PLAN (LESSON PLAN)**

# **UNIT-I: PN Junction Diode**

s		No. of	Tentative	Actual	Teaching	HOD
No.	Topics to be covered	Classes	Date of	Date of	Learning	Sign Woolrlw
	Introduction to	Kequiieu	completion	completion	TLM1	WEEKIY
	course, Course					
1.	Outcomes,	1	17.10.2022			
	Introduction to					
	UNIT-I					
0	Qualitative theory of	1	18.10.2022		TLM1	
2.	the p-n Junction	1	19.10.2022			
3	Diode current	1	20.10.2022		TLM1	
0.	equitation	1				
	The Current		22.10.2022		TLM1	
4.	components in a p-n	1				
	Diode					
5.	The Volt- Ampere	2	24.10.2022		TLM1	
	Characteristic		25.10.2022			
6	Diode Capacitance-	2	26.10.2022		TLM1	
0.	Transition Capacitance		27.10.2022			
7.	Diffusion Capacitance	1	29.10.2022		TLM1	
Q	Operation and char. of	2	31.10.2022		TLM1	
0.	Zener Diode	4	01.11.2022			
9.	Tunnel Diode	1	02.11.2022		TLM1	
10.	UJT	1	03.11.2022		TLM1	
11.	SCR	1	05.11.2022		TLM1	
12.	Assignment-I	1	07.11.2022		TLM3	
No.	of classes required to c	omplete I	JNIT-I: 15	No. of class	es taken:	

# UNIT-II: Diode Applications

s		No. of	Tentative	Actual	Teaching	HOD
No.	Topics to be covered	Classes	Date of	Date of	Learning	Sign
		Required	Completion	Completion	Methods	Weekly
10	Introduction to <b>UNIT-</b>	1	08.11.2022		TLM1	
13.	II & Power supplies	L				
14.	Full wave Rectifiers	1	09.11.2022		TLM1	
1 -	Ripple removal using	1	10.11.2022		TLM1	
15.	Capacitive filter	L				
16.	Inductive filter	1	12.11.2022		TLM1	
17.	L section filter	1	14.11.2022		TLM1	
18.	$\pi$ section filter	1	15.11.2022		TLM1	
10	Voltage Regulator	1	16.11.2022		TLM1	
19.	using Zener diode	L	17.11.2022			
20.	Clippers	1	19.11.2022		TLM1	
21.	Clampers	1	21.11.2022		TLM1	
22.	Assignment-II	1	22.11.2022		TLM3	
No.	of classes required to c	omplete I	JNIT-II: 10	No. of class	es taken:	

# UNIT-III: Bipolar Junction Transistor

S. No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	BJT-construction	1	23.11.2022		TLM1	
24.	Different regions of operations	1	24.11.2022		TLM1	

25.	Transistor Current components	1	26.11.2022	TLM1			
26.	Emitter Efficiency, Transport Factor, Large Signal Current Gain	1	28.11.2022	TLM1			
27.	Input and Output characteristics of CB Configuration	2	29.11.2022 30.11.2022	TLM1			
28.	Input and Output characteristics of CE Configuration	2	01.12.2022 03.12.2022	TLM1			
29.	Input and Output characteristics of CC Configuration	2	05.12.2022 06.12.2022	TLM1			
30.	Relation between $\alpha$ , $\beta$ and $\gamma$	1	07.12.2022	TLM1			
31.	Ebers-Moll Model.	1	08.12.2022	TLM1			
32.	Assignment-III	1	10.12.2022	TLM3			
No.	No. of classes required to complete UNIT-III: 13 No. of classes taken:						

## **UNIT-IV: Field Effect Transistors**

e		No. of	Tentative	Actual	Teaching	HOD					
S. No	Topics to be covered	Classes	Date of	Date of	Learning	Sign					
NO.		Required	Completion	Completion	Methods	Weekly					
22	FFT Construction	2	17.12.2022		TLM2						
00.		4	19.12.2022								
34.	Classification of FET	1	20.12.2022		TLM1						
25	Comparison between	2	21.12.2022		TLM1						
35.	FET and BJT	4	22.12.2022								
	Drain and Transfer		24.12.2022		TLM1						
36.	Characteristics of n-	2	26.12.2022								
	channel JFET										
	Drain and Transfer		27.12.2022		TLM1						
37.	Characteristics of p-	2	28.12.2022								
	JFET										
	n-channel		29.12.2022		TLM1						
38.	enhancement	1									
	MOSFET										
	Drain and Transfer		31.12.2022		TLM2						
39.	Characteristics	2	02.01.2023								
	nMOSFET										
	Drain and Transfer		03.01.2023		TLM1						
40.	Characteristics of p-	2	04.01.2023								
	channel MOSFET										
41.	MOS Capacitor	1	05.01.2023		TLM1						
42.	Assignment-IV	1	07.01.2023		TLM3						
No.	No. of classes required to complete UNIT-IV: 16 No. of classes taken:										

# UNIT-V: BJT Biasing and FET Biasing

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Need for biasing; Operating Point	1	09.01.2023		TLM1	
44.	DC and AC load line	2	10.01.2023 11.01.2023		TLM1	
45.	Stability factors S	1	12.01.2023		TLM1	
46.	Stability factors S'	2	18.01.2023		TLM1	

No. of classes required to complete UNIT-V: 21 No. of classes taken:								
56.	Assignment-V	1	09.02.2023	TLM3				
55.	Small signal equivalent of FET	2	07.02.2023 08.02.2023	TLM1				
54.	FET Voltage divider bias	2	04.02.2023 06.02.2023	TLM1				
53.	Bias Compensation techniques.	2	01.02.2023 02.02.2023	TLM1				
52.	Thermal Runaway and Thermal Stability	1	31.01.2023	TLM1				
51.	Self Bias	1	30.01.2023	TLM1				
50.	Problems on Collector to Base Bias	2	26.01.2023 28.01.2023	TLM1				
49.	Collector to Base Bias	1	25.01.2023	TLM1				
48.	Problems on Fixed Bias	1	24.01.2023	TLM1				
47.	Biasing circuits- Fixed bias	2	21.01.2023 23.01.2023	TLM1				
	and S"		19.01.2023					

57.	Topic beyond syllabus: Realization of Level translator with transistor	1	11.02.2023		
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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					
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))					
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))					
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))					
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)					
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)					
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)					
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))					
Cumulative Internal Examination (CIE): M					
Semester End Examination (SEE)					
Total Marks = CIE + SEE	100				

# PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	To Attain a solid foundation in Electronics & Communication Engineering fundamentals						
	with an attitude to pursue continuing education						
PEO 2	To Function professionally in the rapidly changing world with advances in technology						
PEO 3	To Contribute to the needs of the society in solving technical problems using Electronics &						
	Communication Engineering principles, tools and practices						
PEO 4	To Exercise leadership qualities, at levels appropriate to their experience, which addresses						
	issues in a responsive, ethical, and innovative manner?						
PROGRAMME OUTCOMES (POs):							
PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering						

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,
<b>DO 0</b>	natural sciences, and engineering sciences
PO 3	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and
	design system components of processes that meet the specthed needs with appropriate consideration for the public health and safety and the cultural societal and environmental
	consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO 4	<b>Conduct investigations of complex problems</b> : 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 Ethica, Apply athical principles and commit to professional athica and reaponsibilities, and
FUO	norms of the orgineering practice
PO 9	Individual and team work: Eulerian effectively as an individual and as a member or leader
	in diverse teams and in multidisciplinary settings
PO 10	<b>Communication</b> : 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.
РКОС	RAMME SPECIFIC OUTCOMES (PSOs):

<b>PSO 1</b>	Design and develop modern communication technologies for building the inter disciplinary
	skills to meet current and future needs of industry
<b>PSO 2</b>	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
<b>PSO 3</b>	Apply the Signal processing techniques to synthesize and realize the issues related to real time
	applications

**Course Coordinator** Dr. T. Satyanarayana **Module Coordinator** Dr. G. Srinivasulu **Head of the Department** Dr. Y. Amar Babu LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING, (AUTONOMOUS)



Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230. Phone: 08659-222933, Fax: 08659-222931

**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING** 

#### COURSE HANDOUT

#### PART-A

Name of Course Instructor: Mr. B. SREENIVASA REDDYCourse Name & Code: PC-I, 20FE01L-T-P Structure: 2-0-0Program/Sem/Sec: ECE-C -I SEMA.Y.: 2022-23

Credits: 02

PREREQUISITE: NIL

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** To improve English language proficiency of the students on various aspects like vocabulary, grammar, communication skills, listening skills, Reading &Writing skills.

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

CO1	Write sentences and paragraphs using proper grammatical structures and word forms.	L1
CO2	Comprehendthegiventextbyemployingsuitablestrategiesforskimmingand Scanning and draw in ferences	L2
CO3	Write summaries of reading texts using correct tense forms& Appropriate structures.	L1
CO4	Write Formal Letters; Memos & E-Mails	L3
CO5	Edit the sentences/short texts by identifying basic errors of grammar/ vocabulary/syntax	L2

Unit-I

**Exploration** - 'A Proposal to Girdle the Earth – Nellie Bly'; Reading: Skimming for main idea;Scanning for specific information; Grammar & Vocabulary: Content Words; Function Words;Word Forms: verbs, nouns, adjectives and adverbs; Nouns: Countable and Uncountable, Singularand Plural forms; Wh - Questions; Word Order in Sentences; Writing: Paragraph Analysis; Paragraph Writing; Punctuation and CapitalLetters

#### Unit–II

**On Campus-** 'The District School as it Was by One Who Went to it – Warren Burton'; Reading: Identifying Sequence of Ideas;

Grammar&Vocabulary: Cohesive Devices:Linkers/signposts/Transition signals, Synonyms, MeaningsofWords/Phrasesin thecontext; Writing: Memo Drafting.

#### Unit-III

WorkingTogether-'The Future of Work'

Reading: Making basic inferences; Strategies to use text clues for comprehension; Summarizing;Grammar & Vocabulary:Verbs: Tenses; Reporting Verbs for Academic Purpose; Writing: Rephrasing what is read; Avoiding redundancies and repetitions Abstract Writing/Summarizing.

#### Unit-IV

**'A.P.J.AbdulKalam'**; Grammar & Vocabulary: Direct & Indirect Speech; articles and their Omission; Writing :E-MailDrafting.

#### Unit-V

**'C.V.Raman'**; Grammar&Vocabulary: Subject-verb Agreement; Prepositions; Writing: Formal Letter Writing.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1		1		1			3	3		2			
CO2		1		1		1			3	3		2			
CO3		1		1		1			3	3		2			
CO4		1		1		1			3	3		2			
CO5		1		1		1			3	3		2			
<b>1</b> - Low					<b>2</b> –M	edium	۱			<b>3 -</b> Higl	h				

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

#### **TEXTBOOKS:**

- T1 Prabhavati. Y & etal , "English All Round –Communication Skills for Undergraduate Learners" ,Orient Black Swan, Hyderabad, 2019
- T2 "The Great Indian Scientists" published by Cengage Learning India Pvt. Ltd., Delhi, 2017

#### **REFERENCE BOOKS:**

- **R1** Swan, M., "Practical English Usage", Oxford University Press, 2016.
- R2 Kumar, Sand Latha, P, "Communication Skills", Oxford University Press, 2018.

- **R3** Rizvi Ashraf M., "Effective Technical Communication", Tata Mc Graw Hill, NewDelhi, 2008.
- **R4** Baradwaj Kumkum, "Professional Communication", I. K. International PublishingHousePvt.Lt., NewDelhi, 2008.
- **R5** Wood, F. T., "Remedial English Grammar", Macmillan, 2007.

#### PART-B

## COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I:

s		No. of	Tentative	Actual	Teaching	HOD
J.	Topics to be covered	Classes	Date of	Date of	Learning	Sign
140.		Required	Completion	Completion	Methods	Weekly
1.	Introduction to syllabus	01	17.10.2022		TLM2	
			20.10.2022			
2	Proposal to Girdle	04	21.10.2022		TIMO	
Ζ.	The Earth by Nellie Bly	04	27.10.2022		I LIVIZ	
			28.10.2022			
	Reading: Skimming for		21 10 2022			
3.	main idea ; Scanning for	02	02 11 2022		TLM2	
	specific information		05.11.2022			
	Content words and	02	04.11.2022		TIMO	
4.	Function words	02	07.11.2022		I LIVIZ	
	Word forms – verbs;		10.11.2022			
5.	Adjectives & adverbs	02	11.11.2022		TLM2	
			1111112022			
	Nouns – countable &					
	uncountable, singular and		14.11.2022			
6.	plural nouns	02	21.11.2022		TLM2	
	Word order in sentences					
	"Wh" questions					
	Writing: Paragraph writing				TIM2	
7.	Paragraph analysis	01	24.11.2022		TLM6	
No. d	of classes required to comple	te UNIT-I: 1	.4	No. of classe	s taken:	

#### UNIT-II:

S.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
NO.		Required	Completion	Completion	Methods	Weekly
	The District School As It		25.11.2022			
8.	Way by One Who Went to	03	28.11.2022		TLM2	
	it - Warren Burton		01.12.2022			
9.	Identifying sequence of ideas	01	02.12.2022		TLM2	

10.	Cohesive devices: linkers /signposts/transition signals	01	05.12.2022		TLM2	
11.	Synonyms meanings of words / Phrases in the context	01	08.12.2022		TLM2	
12.	Essay Writing - Memo drafting	01	09.12.2022		TLM2 TLM6	
No. d	of classes required to comple	No. of classe	s taken:			

#### UNIT-III:

S.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
140.		Required	Completion	Completion	Methods	Weekly
			19.12.2022			
12	The Future of Work	04	22.12.2022		TLM2	
13.	The Future of Work	04	23.12.2022		TLM6	
			26.12.2022			
	Making basic inferences,					
14.	Strategies to uses text clues	01	29.12.2022		TLM2	
	for comprehension					
	Verbs tenses reporting		30.12.2022			
15.	verbs for academic purpose	03	02.01.2023		TLM2	
	veros foi academie purpose		05.01.2023			
16	Summarizing rephrasing	01	06 01 2023		ті м2	
10.	what is read	01	00.01.2025		TEIVIZ	
	avoiding redundancies and					
17	repetitions - Abstract	01	09 01 2023		TLM2	
17.	Writing	01	03.01.2025		TLM6	
	No. of classes required to com	No. of classe	s taken:			

#### UNIT-IV:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	APJ Abdul Kalam	02	12.01.2023 20.01.2023	•	TLM2 TLM2	
19.	Direct-Indirect speech	01	21.01.2023		TLM2	
20.	Articles and their omission	01	23.01.2023		TLM2	
21.	E-mail drafting	01	27.01.2023		TLM2 TLM6	
No.	of classes required to comple	No. of classe	s taken:			

#### UNIT-V:

c		No. of	Tentative	Actual	Teaching	HOD
J.	Topics to be covered	Classes	Date of	Date of	Learning	Sign
INO.		Required	Completion	Completion	Methods	Weekly
22	22 C V Paman		02.02.2023		TIND	
22.	C. V. Kalliali	02	03.02.2023		I LIVIZ	
23.	Subject – Verb agreement	01	06.02.2023		TLM2	
24.	Prepositions	01	10.02.2023		TLM2	
25	Formal Letter Writing	01	11 02 2022		TLM2	
25.			11.02.2023		TLM6	
No. o	f classes required to comple	No. of classe	s taken:			

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

## PART-C

## **EVALUATION PROCESS (R17 Regulation):**

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

#### PART-D

#### **PROGRAMME OUTCOMES (POs):**

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. B. Sreenivasa Reddy	Dr. B. Samrajya Lakshmi	Dr. B. Samrajya Lakshmi	Dr. A. Ramireddy
Signature				



#### COURSE HANDOUT Part-A

PROGRAM	: I B. Tech., I-Sem., ECE-C
ACADEMIC YEAR	: 2022-23
COURSE NAME & CODE	: Differential Equtions
L-T-P STRUCTURE	: 4-1-0
COURSE CREDITS	:4
COURSE INSTRUCTOR	: Dr. K.R. Kavitha
COURSE COORDINATOR	: Dr. A. Rami Reddy
PRE-REQUISITES	: Differentiation, Integration

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The objective of this course is to introduce the first order and higher order differential equations, functions of several variables. The students will also learn solving of first order partial differential equations.

#### **COURSE OUTCOMES (COs)**

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

CO1: Apply first order and first degree differential equations to find orthogonal trajectories.

CO2: Distinguish between the structure and methodology of solving higher order differential equations with constant coefficients.

CO3: Apply various Numerical methods to solve initial value problem.

CO4: Generate the infinite series for continuous functions and investigate the functional dependence. CO5: Solve partial differential equations using Lagrange's method.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2	-	2	-	-	-	-	-	-	-	1
CO2	3	2	-	2	-	-	-	-	-	-	-	1
CO3	3	2	-	2	-	-	-	-	-	-	-	1
CO4	2	1	-	1	-	-	-	-	-	-	-	1
CO5	3	2	-	2	-	-	-	-	-	-	-	1

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

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", 42<sup>nd</sup>Edition, Khanna Publishers, New Delhi, 2012.

T2 Dr. B. V. Ramana, "Higher Engineering Mathematics", 1<sup>st</sup>Edition, TMH, New Delhi, 2010. BOS APPROVED REFERENCE BOOKS:

- **R1** M. D. Greenberg, "*Advanced Engineering Mathematics*", 2<sup>nd</sup> Edition, TMH Publications, New Delhi, 2011.
- **R2** Erwin Kreyszig, "Advanced Engineering Mathematics", 8<sup>th</sup> Edition, John Wiley & sons, New Delhi, 2011.
- **R3** W.E. Boyce and R. C. Diprima, "*Elementary Differential Equations*", 7<sup>th</sup> Edition, John Wiley & sons, New Delhi,2011.
- **R4** S. S. Sastry, "*Introductory Methods of Numerical Analysis*" 5<sup>th</sup> Edition, PHI Learning Private Limited, New Delhi, 2012.

# Part-B

<b>COURSE DELIVERY PLAN</b>	(LESSON PLAN):
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S.	Topics to be sourced	No. of	Tentative	Actual Data of	Teaching	Learning	Text Book	HOD Sign
110.	Topics to be covered	Required	Completion	Completion	Methods	COs	followed	Weekly
1.		_	17/10/2022					
	Bridge Course	5	to 22/10/2022					
2.	Introduction to the course	1	25/10/2022		TLM2			
3.	Course Outcomes	1	27/10/2022		TLM2			

# UNIT-I: Differential Equations of First Order and First Degree

S. No.	Topics to be covered	d No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
4.	Introduction to UNIT I	1	28/10/2022	•	TLM2	CO1	T1,T2	
5.	Formation of Differenti Equations	al 1	29/10/2022		TLM1	CO1	T1,T2	
6.	Exact DE	1	31/10/2022		TLM1	CO1	T1,T2	
7.	Non-exact DE Type I	1	01/11/2022		TLM1	CO1	T1,T2	
8.	Non-exact DE Type II	1	03/11/2022		TLM1	CO1	T1,T2	
9.	Non-exact DE Type III	1	04/11/2022		TLM1	CO1	T1,T2	
10.	Non-exact DE Type IV	1	05/11/2022		TLM1	CO1	T1,T2	
11.	Orthogonal Trajectories (Cartesian)	8 1	07/11/2022		TLM1	CO1	T1,T2	
12.	Orthogonal Trajectories (Cartesian)	3 1	8/11/2022		TLM1	CO1	T1,T2	
13.	Orthogonal Trajectories (polar)	5 1	10/11/2022		TLM1	CO1	T1,T2	
14.	Orthogonal Trajectories (polar)	8 1	12/11/2022		TLM1	CO1	T1,T2	
15.	TUTORIAL 1	1	11/11/2022		TLM3	CO1	T1,T2	
No. of comp	f classes required to lete UNIT-I	12				No. of class	es taken:	

## **UNIT-II: Higher Order Differential Equations**

<b>S</b> .		No. of	Tentative	Actual	Teaching	Learning	Text	HOD
No.	Topics to be covered	Classes	Date of	Date of	Learning	Outcome	Book	Sign
		Required	Completion	Completion	Methods	COs	followed	Weekly
16.	Introduction to UNIT II	1	14/11/2022		TLM2	CO2	T1,T2	
17.	Solving a homogeneous DE	1	15/11/2022		TLM1	CO2	T1,T2	
18.	Finding Particular Integral, P.I for $e^{ax+b}$	1	17/11/2022		TLM1	CO2	T1,T2	
19.	P.I for Cos bx or sin bx	1	18/11/2022		TLM1	CO2	T1,T2	
20.	P.I for polynomial function	1	19/11/2022		TLM1	CO2	T1,T2	
21.	P.I for polynomial function	1	21/11/2022		TLM1	CO2	T1,T2	
22.	P.I for $e^{ax+b}v(x)$	1	22/11/2022		TLM1	CO2	T1,T2	
23.	P.I for $e^{ax+b}v(x)$	1	24/11/2022		TLM1	CO2	T1,T2	

$\begin{array}{ c c c c c } 24. & x^k v(x) \end{array}$	1	25/11/2022	TLM1	CO2	T1,T2	
25. P.I for $x^k v(x)$	1	26/11/2022	TLM1	CO2	T1,T2	
26. Method of Variation of parameters	1	28/11/2022	TLM1	CO2	T1,T2	
27. Method of Variation of parameters	1	29/11/2022	TLM1	CO2	T1,T2	
28. <b>TUTORIAL 2</b>	1	02/12/2022	TLM3	CO2	T1,T2	
No. of classes required to complete UNIT-II	13			No. of class	es taken:	

# UNIT-III: Numerical solution of Ordinary Differential Equations

<b>S.</b>		No. of	Tentative	Actual	Teaching	Learning	Text	HOD
No.	Topics to be covered	Classes	Date of	Date of	Learning	Outcome	Book	Sign
		Required	Completion	Completion	Methods	COs	followed	Weekly
29.	Introduction to Unit-III	1	01/12/2022		TLM2	CO3	T1,T2	
30.	Numerical Methods	1	03/12/2022		TLM1	CO3	T1,T2	
31.	Solution by Taylor's series	1	05/12/2022		TLM1	CO3	T1,T2	
32.	Solution by Taylor's series	1	06/12/2022		TLM1	CO3	T1,T2	
33.	Picard's Method	1	08/12/2022		TLM1	CO3	T1,T2	
34.	Picard's Method	1	09/12/2022		TLM1	CO3	T1,T2	
35.	Assignment	1	10/12/2022				T1,T2	
	I MI	D EXAMIN	NATIONS (12-	12-2022 TO 17	7-12-2022)			
36.	Euler's Method	1	19/12/2022		TLM1	CO3	T1,T2	
37.	Modified Euler's Method	1	20/12/2022		TLM1	CO3	T1,T2	
38.	Modified Euler's Method	1	22/12/2022		TLM1	CO3	T1,T2	
39.	Runge- Kutta Method	1	23/12/2022		TLM1	CO3	T1,T2	
40.	Runge- Kutta Method	1	24/12/2022		TLM1	CO3	T1,T2	
41.	TUTORIAL 3	1	30/12/2022		TLM3	CO3	T1,T2	
No	. of classes required to complete UNIT-III	12			No. of class	es taken:		

## **UNIT-IV: Functions of Several Variables**

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
42.	Introduction to UNIT IV	1	26/12/2022		TLM2	CO4	T1,T2	
43.	Generalized Mean Value Theorem, Taylor's series	1	27/12/2022		TLM1	CO4	T1,T2	
44.	Maclaurin's series	1	29/12/2022		TLM1	CO4	T1,T2	
45.	Functions of several variables	1	31/12/2023		TLM1	CO4	T1,T2	
46.	Functions of several variables	1	02/01/2023		TLM1	CO4	T1,T2	
47.	Jacobians( Cartesian coordinates)	1	03/01/2023		TLM1	CO4	T1,T2	

48.	Jacobians (polar, coordinates)	1	05/01/2023	TLM1	CO4	T1,T2	
49.	Jacobians (cylindrical, spherical coordinates)	1	06/01/2023	TLM1	CO4	T1,T2	
50.	Functional dependence	1	07/01/2023	TLM1	CO4	T1,T2	
51.	Functional dependence	1	09/01/2023	TLM1	CO4	T1,T2	
52.	Maxima and Minima	1	10/01/2023	TLM1	CO4	T1,T2	
53.	Maxima and Minima of functions of two variables	1	17/01/2023	TLM1	CO4	T1,T2	
54.	TUTORIAL 4	1	20/01/2023	TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-IV			13		No. of clas	sses taken:	

## **UNIT-V: Partial Differential Equations**

S. No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	Learning Outcome	Text Book	HOD Sign
		Required	Completion	Completion	Methods	COs	followed	Weekly
55.	Introduction to UNIT V	1	19/01/2023		TLM2	CO5	T1,T2	
56.	Partial Differential equations	1	21/01/2023		TLM1	CO5	T1,T2	
57.	Formation of PDE by elimination of arbitrary constants	1	23/01/2023		TLM1	CO5	T1,T2	
58.	Formation of PDE by elimination of arbitrary functions	1	24/01/2023		TLM1	CO5	T1,T2	
59.	Formation of PDE by elimination of arbitrary functions	1	27/01/2023		TLM1	CO5	T1,T2	
60.	Formation of PDE by elimination of arbitrary functions	1	28/01/2023		TLM1	CO5	T1,T2	
61.	Solving of PDE	1	30/01/2023		TLM1	CO5	T1,T2	
62.	Solving of PDE	1	31/01/2023		TLM1	CO5	T1,T2	
63.	Lagrange's Method	1	02/02/2023		TLM1	CO5	T1,T2	
64.	Lagrange's Method	1	04/02/2023		TLM1	CO5	T1,T2	
65.	Lagrange's Method	1	06/02/2023		TLM1	CO5	T1,T2	
66.	TUTORIAL 5	1	03/02/2023		TLM3	CO5	T1,T2	
67.	Assignment	1	09/02/2023			CO3, CO4, CO5	T1,T2	
68.	Revision	1	10/02/2023			CO3, CO4, CO5	T1,T2	
69.	Revision	1	11/02/2023			CO1, CO2	T1,T2	
No	b. of classes required to complete UNIT-V	12			No. of class	ses taken:		

#### **Contents beyond the Syllabus**

S. No.	Topics to be	No. of	Tentative	Actual	Teaching	Learning	Text	HOD
	covered	Classes	Date of	Date of	Learning	Outcome	Book	Sign

		Required	Completion	Completion	Methods	COs	followed	Weekly		
70.	Lagrange's Method Other models	1	12/01/2023		TLM1	CO4	T1,T2			
71.	Solving of PDE other methods	1	07/02/2023		TLM5	CO5	T1,T2			
	No. of classes	2			No. of clas	ses taken:				
	II MID EXAMINATIONS (13-02-2023 TO 18-02-2023)									

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

# PART-C EVALUATION PROCESS (R20 Regulation):

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

# PART-D

# **PROGRAMME OUTCOMES (POs):**

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

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

DR. K.R. KAVITHA	Dr. A. RAMI REDDY	Dr. A. RAMI REDDY	Dr. A. RAMI REDDY
Course Instructor	Course Coordinator	Module Coordinator	HOD



#### FRESHMAN ENGINEERING DEPARTMENT

## **COURSE HANDOUT**

## PART-A

Name of Course Instructor Course Name & Code	: Mrs.N.Aruna : Applied Physics, 20FE07		
L-T-P Structure	: 2-1-0	Credits	: 4
Program/Sem/Sec	: B.Tech., CSM, I-Sem., Section- A	A.Y	: 2022-23

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** It enables the students to understand the fundamental concepts of Optics , quantum mechanics, free electron theory of metals, semi conductors, dielectrics and their applications.

#### COURSE OUTCOMES (Cos): At the end of the course, students are able to

CO 1	Define the nature of interference and diffraction (Remember - L1)
CO 2	Apply the lasers and optical fibers in different fields (Apply - L3)
CO 3	Estimate the electrical conductivity of metals (Understand - L2)
CO 4	Analyze the properties of semiconducting materials (Understand – L2)
CO5	Classify the different types of magnetic and dielectric materials (Understand - L2)

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	PO11	PO12
CO1	3	3	1	1	1	1	1	-	-	-	-	1
CO2	3	3	2	1	1	1	1	-	-	-	-	1
CO3	3	3	1	1	1	1	1	-	-	-	-	1
CO4	3	3	1	1	1	1	1	-	-	-	-	1
CO5	3	3	1	1	1	1	1	-	-	-	-	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 : V. Rajendran, "Engineering Physics", TMH, New Delhi, 6th Edition, 2014.

**T2** : M.N. Avadhanulu, TVS Arun Murthy, "Applied *Physics*", S. Chand & Co., 2<sup>nd</sup> Edition, 2014.

#### **BOS APPROVED REFERENCE BOOKS:**

R1 : M.N. Avadhanulu, TVS Arun Murthy, "Applied Physics", S. Chand & Co., 2<sup>nd</sup>

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,1<sup>st</sup> Edition, 2016.
- R4 Hitendra K Mallik , AK Singh " *Engineering Physics*", TMH, New Delhi, 1<sup>st</sup> Edition, 2009.

#### PART-B

#### **COURSE DELIVERY PLAN (LESSON PLAN):**

#### **UNIT-I: Interference and Diffraction**

		No. of	Tentative	Actual	Teaching	HOD
S.No.	Topics to be covered	Classes	Date of	Date of	Learning	Sign
		Required	Completion	Completion	Methods	Weekly
	Introduction to Course and					
1.	COs	1	17-10-2022		TLM2	
	Introduction to Unit-I					
2	Superposition of waves,	1	18-10-2022		TI M1	
2.	Conditions for Interference	1			1 12/011	
3	Coherence		21-10-2022		TI M1	
5.	Concrence,				I LIVII	
4	Interference from thin films	1	22-10-2022		TI M1 2	
		1			112111,2	
5	Newton's rings	1	22-10-2022		TI M1 2	
5.	Newton's rings	1			112111,2	
6	Newton's rings		25-10-2022		TI M1	
0.	Newton stings				I LIVI I	
7	Michelson's interferometer	1	28-10-2022		TI M2	
7.		1			I LIVIS	
8	Diffraction Introduction	1	29-10-2022		TI M1 2	
0.	Dimaction-introduction	1			1 LIVI1,2	
9.	Single slit diffraction	1	29-10-2022		TLM2	
10		1	31-10-2022			
10.	Single slit diffraction	1			TLM2	
1.1	Circular aperture		01-11-2022			
11.		1			TLM1,2	
10	Diffraction – N parallel slits		04-11-2022		<b>TY 1 (2</b>	
12.		1			TLM3	
10	grating-Characteristics		05-11-2022		TTV 1 (0	
13.	Brand Characteristics		00 11 2022		TLM2	
			05-11-2022			
14.	Resolving power of Grating	1			TLM1.2	
			07-11-2022			
15.	Problems/ Assignment	1	0, 11 2022		TLM1	
No. of	classes required to complete UN	UT_I 15	l	No of classes	taken:	
110.01	classes required to complete ON	11-1.15		110. 01 0103868		

#### **UNIT-II: Lasers and Optical fibers**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to UNIT- II		08-11-2022		TLM1	
2.	Characteristics of Lasers,	2	11-11-2022		TLM2	
3.	Principle of laser	1	12-11-2022		TLM1	
4.	Population inversion, Meta	1	14-11-2022		TLM2	

	stable state, pumping					
5.	Einstein's coefficients	1	15-11-2022		TLM1	
6.	Laser Components	1	18-11-2022		TLM3	
7.	,Nd-YAG Laser	1	19-11-2022		TLM2	
8.	He-Ne gas laser,	1	19-11-2022		TLM2	
9.	Applications of lasers	1	21-11-2022		TLM2	
10.	Principle and Structure of optical fibre	1	22-11-2022		TLM2	
11.	Acceptance angle &Numerical Aperture	1	25-11-2022		TLM1	
12.	Single mode and multimode fibers	1	26-11-2022		TLM2	
13.	Step index and Graded index fibers	1	26-11-2022		TLM2	
14.	Applications	1	28-11-2022		TLM1,2	
11	Problems/ Assignment	1	29-11-2022		TLM2	
No. of	classes required to complete UN	No. of classes	taken:			

# UNIT-III: Principles of Quantum Mechanics and Classical Free Electron theory of Mmetals

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-Unit III De Broglie hypothesis,	1	02-12-2022		TLM1	
2.	Properties of matter waves	1	03-12-2022		TLM2	
3.	Davisson and Germer Experiment	1	03-12-2022		TLM2	
4.	Schrodinger wave equation- Time independent	1	05-12-2022		TLM2	
5.	Time dependent wave equation		06-12-2022		TLM1	
6.	Physical significance of wave function,	1	09-12-2022		TLM1	
7.	Particle in a box	1	10-12-2022		TLM1	
8.	Particle in a box	1	10-12-2022		TLM1	
9.	Classical free electron theory- postulates	1	19-12-2022		TLM1	
10.	drift velocity, Expression for electrical conductivity	1	20-12-2022		TLM1	
11.	Advantageous and drawbacks	1	23-12-2022		TLM1	

12.	Fermi –Dirac statistics	1	24-12-2022		TLM1	
13.	Classification of solids -band theory	1	24-12-2022		TLM2	
14.	Problems	1	26-12-2022		TLM2	
15.	Assignment	1	27-12-2022			
No. of classes required to complete UNIT-III: 15				No. of classes	taken:	

## **UNIT-IV : Semiconductor Physics**

S.No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
		Required	Completion	Completion	Methods	Weekly
1.	Introduction to UNIT-IV	1	30-12-2022		TLM1	
2.	Carrier concentration - Intrinsic semiconductor	1	31-12-2022		TLM1	
3.	Carrier concentration - Intrinsic semiconductor	1	31-12-2022		TLM1	
4.	Carrier concentration - Extrinsic semiconductor	1	02-01-2023		TLM1	
5.	Carrier concentration - Extrinsic semiconductor	1	03-01-2023		TLM1	
6.	Energy band gap of a Semiconductor	1	06-01-2023		TLM1.2	
7.	Drift and diffusion current	1	07-01-2023		TLM3	
8.	Einstein relations	1	07-01-2023		TLM1,2	
9.	Hall effect	1	09-01-2023		TLM1,2	
10.	Direct band gap and indirect band gap semiconductors	1	10-01-2023		TLM1,2	
11.	Solar cell, Applications	1	20-01-2023		TLM2	
12.	Problems	1	21-01-2023		TLM5	
13.	Assignment	1	21-01-2023		TLM3	
No. of	classes required to complete UN	IT-IV: 13		No. of classes	s taken:	

	magnetie and Dielectric ma	iter lang				
S.No.	Topics to be covered	No. of	Tentative	Actual	Teaching	HOD
		Classes	Date of	Date of	Learning	Sign
		Required	Completion	Completion	Methods	Weekly

1.	Introduction to UNIT-V	1	23-01-2023		TLM1
2.	Magnetic parameters	1	24-01-2023		TLM1
3.	Classification of magnetic materials	1	27-01-2023		TLM3
4.	Hysteresis loop	1	28-01-2023		TLM2
5.	Soft &Hard magnetic materials	1	28-01-2023		TLM2
6.	Types of polarization- Electronic polarization	1	30-01-2023		TLM1,2
7.	Ionic and Orientation Polarization	1	31-01-2023		TLM2
8.	Local field	1	03-02-2023		TLM1
9.	Classius mosotti equation	1	04-02-2023		TLM1
10.	Applications	1	04-02-2023		TLM2
11.	Problems	1	03-02-2023		TLM3
12.	Assignment	1	07-02-2023		TLM3
13.	Revision	1	10-02-2023		TLM3
14.	Revision	1	11-02-2023		TLM3
15.	Revision	1	11-02-2023		TLM3
No. of classes required to complete UNIT-V: 15				No. of classes	taken:

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

## **PROGRAMME OUTCOMES (POs):**

<b>PO 1</b>	Engineering knowledge: Apply the knowledge of mathematics, science, engineering
	fundamentals, and an engineering specialization to the solution of complex engineering
	problems.
<b>PO 2</b>	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.
<b>PO 3</b>	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.
<b>PO 4</b>	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 5	<b>Modern tool usage</b> : 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	<b>The engineer and society</b> : 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	<b>Environment and sustainability</b> : 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	<b>Ethics</b> : Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	<b>Individual and team work</b> : Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	<b>Communication</b> : 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	<b>Project management and finance</b> : 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	<b>Life-long learning</b> : 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	Communication: Design and develop modern communication technologies for building the							
	inter disciplinary skills to meet current and future needs of industry.							
PSO 2	VLSI and Embedded Systems: 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							
PSO 3	Signal Processing: Apply the Signal processing techniques to synthesize and realize the issues							
	related to real time applications							

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mrs.N.Aruna	Mrs.p.Vijaya Sirisha	Dr. S.Yusub	Dr. A. Rami Reddy



#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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# COURSE HANDOUT PART-A

Name of Course Instructor	: Mr. K.V. Ashok	
Course Name & Code	: Basic Electrical Engineering – 20EE01	
L-T-P Structure	: 3-0-0	Credits: 3
Program/Sem/Sec	: B.Tech., ECE., I-Sem., Section- C A.Y	: 2022-23

#### **PRE-REQUISITE:** Physics

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

This course deals with nature of basic electrical components, analysis of steady state and transient response of linear electrical networks. It also deals with the principle of operation of AC and DC machines.

#### **COURSE OUTCOMES (COs):** At the end of the course, students are able to

CO 1	Illustrate the behavior of active and passive components, series and parallel circuits, self and
	mutual inductance of magnetic circuits, network functions and two port networks using circuit
	and mathematical approaches. (Understand – L2)
CO 2	Interpret the working principles of AC and DC machines along with grounding and earthling
	using electrical engineering fundamentals and mathematical approaches.(Understand – L2)
CO 3	Apply mesh analysis, nodal analysis and network theorems to solve the Thevinen's voltage,
	Norton's current and maximum power transfer of the linear circuits. (Apply – L3)
<b>CO 4</b>	Analyze the concepts of bandwidth, quality factor of series and parallel resonant circuits using
	circuit and mathematical approaches. (Analyze – L4)

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

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C01	2	1	-	-	-	-	-	-	-	1	-	-	-	-	2
CO2	2	1	1	1	-	-	-	-	-	1	-	_	-	-	2
CO3	3	3	1	1	-	-	-	-	-	1	_	_	-	-	2
CO4	3	2	1	1	_	_	1	_	-	1	_	_	-	_	3

Correlation Levels: 1-Slight (Low), 2-Moderate (Medium), 3-Substantial (High) and No correlation: '-'

#### **TEXT BOOKS:**

- T1 Ravish R Singh, "Network Analysis and synthesis", Tata McGraw Hill Pvt Ltd, New Delhi.2013
- T2 B.L. Theraja, A.K. Theraja, "Electrical Technology in S.I. UNITS. Volume II. AC & DC
- MACHINES"Published by S. Chand & Company Ltd 2016.

#### **REFERENCE BOOKS:**

- **R1** M.S Naidu and S. Kamakshaiah, "Introduction to Electrical Engineering", TMH Publication, 3<sup>rd</sup> edition 2017.
- **R2** A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7<sup>th</sup> Edition, New Delhi 2017.



S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Course, COs	1	17-10-2022			
2.	Basic definitions, Types of elements- active and passive	1	18-10-2022			
3.	Ohm's Law	1	19-10-2022			
4.	Kirchhoff's Laws	2	22-10-2022			
5.	Network reduction techniques- series, parallel	1	25-10-2022			
6.	star to delta, delta to star transformations	2	27-10-2022			
7.	source transformations	1	29-10-2022			
8.	mesh analysis	2	01-11-2022			
9.	nodal analysis	2	03-11-2022			
10.	Duality and dual networks	1	05-11-2022			
No. of	classes required to complete UNIT-I	14	No. (	of classes tak	en	

#### **COURSE DELIVERY PLAN (LESSON PLAN): Section-C UNIT-I: Electrical Circuit Fundamentals**

UN	IT-II: MAGNETIC CIRCUITS & AC F	UNDAMEN	NTALS			
S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Self and mutual inductance, Dot convention	1	07-11-2022			
2.	Coefficient of coupling, analysis of series and parallel magnetic circuits	1	08-11-2022			
3.	Coupled circuits	1	09-11-2022			
4.	Peak, R.M.S, average and instantaneous values, Form factor	1	10-11-2022			
5.	Peak factor, Phase and Phase difference	1	14-11-2022			
6.	Concepts of Reactance, Impedance	1	15-11-2022			
7.	Susceptance and Admittance	1	16-11-2022			
8.	Real, Reactive Powers	1	17-11-2022			
9.	Apparent Power Factor, Power Factor	1	19-11-2022			
No. of	classes required to complete UNIT-II	09	No. c	of classes tak	en	

### **UNIT-III: : NETWORK THEOREMS & RESONANCE CIRCUITS**

S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Superposition Theorem,	2	22-11-2022			
2.	Thevenin's Theorem,	3	26-11-2022			
3.	Norton's Theorem,	3	30-11-2022			
4.	Maximum power transfer theorem	3	05-12-2022			
5.	Reciprocity Theorem	2	07-12-2022			
6.	Milliman's Theorem	1	09-12-2022			
7.	Series resonant circuit	1	19-12-2022			

8.	Parallel resonant circuit	1	20-12-2022			
9.	concept of band width, quality factor.	1	21-12-2022			
No. of	o. of classes required to complete UNIT-III 17		No. c	of classes taken	L I	

#### UNIT-IV: NETWORK FUNCTIONS & TWO PORT NETWORKS

S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Network Functions: Driving point and transfer functions,	2	24-12-2022			
2.	Poles and zeros of network functions,. Two-Port Networks:	2	27-12-2022			
3.	Restrictions of pole and zero locations for driving point and transfer functions	1	28-12-2022			
4.	Z-Parameters	2	31-12-2022			
5.	Y-Parameters	2	03-01-2023			
6.	ABCD-Parameters	2	05-01-2023			
7.	h-Parameters	2	09-01-2023			
8.	Inter-relationship between parameters	2	12-01-2023			
9.	Two port network connections in series	2	19-01-2023			
10.	Two port network connections in parallel and cascaded.	2	23-01-2023			
No. of	classes required to complete UNIT-IV	19	No. c	of classes tak	en	

#### **UNIT-V: ELECTRICAL MACHINES**

S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Electrical Machines: Types of Electrical Machines and their applications;	2	25-01-2023			
2.	Working principle of DC machines,	2	30-01-2023			
3.	Working principle of single phase transformer: EMF equation	2	01-02-2023			
4.	Working principle of 3-phase induction motor, EMF equation. Electrical Safety:	2	04-02-2023			
5.	Electrical Safety Definition, precautions.	2	07-02-2023			
6.	Concepts of grounding and earthing.	1	08-02-2023			
No. of	classes required to complete UNIT-V	11	No. (	of classes tak	an	

#### **Contents beyond the Syllabus**

S.No.	Topic/s	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	LCR Meter working	1	09-02-2023			

# **Teaching Learning Methods**

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

# PART-C

#### **EVALUATION PROCESS:**

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

### PART-D

PROGRA	AMME 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
<b>DO 4</b>	considerations.
PO 4:	<b>Conduct investigations of complex problems</b> : Use research-based knowledge and research methods including design of experiments, analysis and intermetation of data, and surthasis of the
	information to provide valid conclusions.
PO 5.	Modern tool usage: Create select and apply appropriate techniques resources and modern
105.	engineering and IT tools including prediction and modelling to complex engineering activities
	with an understanding of the limitations
PO 6:	<b>The engineer and society</b> : Apply reasoning informed by the contextual knowledge to assess
2000	societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the
	professional engineering practice
<b>PO 7:</b>	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
<b>DO 10</b>	diverse teams, and in multidisciplinary settings.
PO 10:	<b>Communication</b> : Communicate effectively on complex engineering activities with the
	engineering community and with society at large, such as, being able to comprehend and write
	clear instructions
PO 11.	Project management and finance: Demonstrate knowledge and understanding of the
1011.	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:	<b>Life-long learning</b> : 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.
	independent and life-long learning in the broadest context of technological change.

#### **PROGRAMME SPECIFIC OUTCOMES (PSOs):**

<b>PSO 1:</b>	Communication: Design and develop modern communication technologies for building the
	inter disciplinary skills to meet current and future needs of industry.
<b>PSO 2:</b>	VLSI and Embedded Systems: 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
<b>PSO 3:</b>	Signal Processing: Apply the Signal processing techniques to synthesize and realize the issues
	related to real time applications

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr. K.V.Ashok	Mr. Ch. Mallikharjuna Rao	Dr. G. Srinivasulu	Dr. Y. Amar Babu

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)



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### **DEPARTMENT OF ECE**

## **COURSE HANDOUT**

### PART-A

Name of Course Instructor: Dr. T. Satyanarayana, ProfessorCourse Name & Code: EDC-20EC01L-T-P Structure: 3-0-0Program/Sem/Sec: B. Tech. I-Sem., ECE C Sec

**Regulation**: R20 **Credits:** 03 **A.Y.:** 2022-23

PREREQUISITE: Fundamentals of Physics

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**: This course introduces the Device construction, characteristics and applications of semiconductor devices like PN junction diode, Bipolar Junction Transistor (BJT), Field Effect Transistor (FET), Metal oxide Semiconductor Field Effect Transistor (MOSFET) and various special devices.

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

CO1	Identify the types of Diodes, Transistors, FETs, Biasing techniques and their
	comparisons to select the best approaches for designing the electronic circuits
	using Devices and components
CO2	Interpret the mathematical models of Currents & Voltages of Diodes, Bipolar
	Junction Transistors and Field Effect Transistors and biasing of BJT and FET
	using fundamental circuits
CO3	Apply the knowledge of diodes, transistors and filters for designing the
	rectifiers, Filters, Regulators and Amplifier circuits using Devices and
	components
CO4	Analyze the characteristics of Diodes, Bipolar Junction Transistors, Field
	Effect Transistors and their equivalent models using VI Characteristics and
	mathematical models

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

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
C01	2	3	1	-	-	3	1	-	-	-	1	2	1	1	-
CO2	2	1	2	1	-	3	1	-	-	-	-	1	1	1	-
CO3	3	1	1	-	-	-	1	-	-	-	-	-	2	2	-
CO4	1	3	-	-	-	-	-	-	-	-	1	1	2	2	-
<b>1 -</b> Low					2	-Medi	ium			3	- High				

#### **TEXTBOOKS:**

- **T1** Jacob Millman, Christos C Halkias, Electronic Devices and Circuits, Third edition, Tata McGraw Hill, Publishers, New Delhi. 2012
- **T2** Boylestad R.L. and Louis Nashelsky, Electronic Devices and Circuits, Fourth edition, Pearson/Prentice Hall Publishers, 2014

#### **REFERENCE BOOKS:**

**R1** Ben Streetman and Sanjay Banerjee, Solid State Electronic Devices, Fourth edition, Prentice Hall Publishers, 2014

### PART-B

# COURSE DELIVERY PLAN (LESSON PLAN)

# UNIT-I: PN Junction Diode

S. No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign Weekkler
	Introduction to	Kequiieu	Completion	Completion	TLM1	WCCKIY
	course. Course					
1.	Outcomes.	1	17.10.2022			
	Introduction to					
	UNIT-I					
	Qualitative theory of	1	18.10.2022		TLM1	
2.	the p-n Junction	L	19.10.2022			
3.	Diode current equitation	1	20.10.2022		TLM1	
	The Current		21.10.2022		TLM1	
4.	components in a p-n Diode	1				
5	The Volt- Ampere	2	25.10.2022		TLM1	
5.	Characteristic	4	26.10.2022			
6	Diode Capacitance-	2	26.10.2022		TLM1	
0.	Transition Capacitance	4	27.10.2022			
7.	Diffusion Capacitance	1	28.10.2022		TLM1	
0	Operation and char. of	0	29.10.2022		TLM2	
0.	Zener Diode	2	31.10.2022			
9.	Tunnel Diode	1	01.11.2022		TLM2	
10.	UJT	1	02.11.2022		TLM2	
11.	SCR	1	03.11.2022		TLM2	
12.	Assignment-I	1	04.11.2022		TLM3	
No.	of classes required to c	omplete I	J <b>NIT-I:</b> 15	No. of class	es taken:	

# UNIT-II: Diode Applications

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Introduction to <b>UNIT-</b> <b>II</b> & Power supplies	1	07.11.2022		TLM1	
14.	Full wave Rectifiers	1	09.11.2022		TLM1	
15.	Ripple removal using Capacitive filter	1	10.11.2022		TLM1	
16.	Inductive filter	1	11.11.2022		TLM1	
17.	L section filter	1	14.11.2022		TLM1	
18.	π section filter	1	15.11.2022		TLM1	
19.	Voltage Regulator using Zener diode	1	16.11.2022 17.11.2022		TLM2	
20.	Clippers	1	18.11.2022		TLM2	
21.	Clampers	1	21.11.2022		TLM2	
22.	Assignment-II	1	22.11.2022		TLM3	

#### No. of classes required to complete UNIT-II: 10 No. of classes taken:

S. No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completio n	Teachin g Learning Methods	HOD Sign Weekly
23.	BJT-construction	1	23.11.2022		TLM1	
24.	Different regions of operations	1	24.11.2022		TLM1	
25.	Transistor Current components	1	25.11.2022		TLM1	
26.	Emitter Efficiency, Transport Factor, Large Signal Current Gain	1	28.11.2022		TLM1	
27.	Input and Output characteristics of CB Configuration	2	29.11.2022 30.11.2022		TLM1	
28.	Input and Output characteristics of CE Configuration	2	01.12.2022 02.12.2022		TLM1	
29.	Input and Output characteristics of CC Configuration	2	05.12.2022 06.12.2022		TLM2	
30.	Relation between a, $\beta$ and $\gamma$	1	07.12.2022		TLM2	
31.	Ebers-Moll Model.	1	08.12.2022		TLM2	
32.	Assignment-III	1	09.12.2022		TLM3	
No.	of classes required to	No. of cl	asses tal	ken:		

#### UNIT-III: Bipolar Junction Transistor

#### **UNIT-IV: Field Effect Transistors**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	FET Construction	2	19.12.2022 20.12.2022		TLM1	
34.	Classification of FET	1	21.12.2022		TLM1	
35.	Comparison between FET and BJT	2	22.12.2022 23.12.2022		TLM1	
36.	Drain and Transfer Characteristics of n-channel JFET	2	27.12.2022 28.12.2022		TLM1	
37.	Drain and Transfer Characteristics of p-JFET	2	29.12.2022 30.12.2022		TLM1	
38.	n-channel enhancement MOSFET	1	02.01.2023		TLM1	
39.	Drain and Transfer Characteristics nMOSFET	2	03.01.2023 04.01.2023		TLM2	
40.	Drain and Transfer Characteristics of p-channel MOSFET	2	05.01.2023 06.01.2023		TLM2	
41.	MOS Capacitor	1	09.01.2023		TLM2	
42.	Assignment-IV	1	10.01.2023		TLM3	

No. of classes required to complete UNIT-IV: 16 No. of classes taken:

#### No. of Tentative Actual Teaching HOD S. Topics to be Classes Date of Date of Learning Sign No. covered Completion Methods Weekly Required Completion Need for biasing; 11.01.2023 TLM1 1 43. **Operating Point** 12.01.2023 TLM1 DC and AC load 2 44. 18.01.2023 line 19.01.2023 TLM1 45. Stability factors S 1 20.01.2023 TLM1 Stability factors S' 2 46. and S" 23.01.2023 Biasing circuits-24.01.2023 TLM1 2 47. Fixed bias 24.01.2023 Problems on Fixed 25.01.2023 TLM1 1 48. Bias Collector to Base 27.01.2023 TLM1 1 49. Bias Problems on 30.01.2023 TLM1 2 50. Collector to Base 30.01.2023 Bias 31.01.2023 TLM1 51. Self Bias 1 Thermal Runaway 01.02.2023 TLM2 52. and Thermal 1 Stability 02.02.2023 TLM2 Bias Compensation 53. 2 02.02.2023 techniques. 03.02.2023 FET TLM2 Voltage 2 54. divider bias 06.02.2023 Small signal TLM2 07.02.2023 55. 2 equivalent of FET 08.02.2023 Assignment-V 1 09.02.2023 TLM3 56. No. of classes required to complete UNIT-V: 21 No. of classes taken:

#### **UNIT-V: BJT Biasing and FET Biasing**

57.	Topic beyond syllabus: Realization of Level translator with transistor	1	10.02.2023		TLM1
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Teaching Learning Methods									
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)						
TLM2	РРТ	TLM5	ICT (NPTEL/Swayam Prabha/MOOCS)						
TLM3 Tutorial TLM6 Group Discussion/Project									

<u>PART-C</u>

#### **EVALUATION PROCESS (R20 Regulation):**

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15

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

# PART-D PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

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

#### **PROGRAMME OUTCOMES (POs):**

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering							
	fundamentals, and an engineering specialization to the solution of complex engineering							
	problems							
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex							
	engineering problems reaching substantiated conclusions using first principles of mathematics,							
	natural sciences, and engineering sciences							
PO 3	Design/development of solutions: Design solutions for complex engineering problems and							
	design system components or processes that meet the specified needs with appropriate							
	consideration for the public health and safety, and the cultural, societal, and environmental							
	considerations							
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research							
	methods including design of experiments, analysis and interpretation of data, and synthesis of							
	the information to provide valid conclusions							
P0 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern							
	engineering and 11 tools including prediction and modelling to complex engineering activities							
DO 6	The angineer and acciety. Apply reasoning informed by the contextual knowledge to access							
FUU	societal health safety legal and cultural issues and the consequent responsibilities relevant to							
	the professional engineering practice							
PO 7	<b>Environment and sustainability</b> : Understand the impact of the professional engineering							
107	solutions in societal and environmental contexts, and demonstrate the knowledge of, and need							
	for sustainable development							
P0 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.							

P0 12Life-long learning: Recognize the need for and have the preparation and ability to engage in<br/>independent and life-long learning in the broadest context of technological change.PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Design and develop modern communication technologies for building the inter disciplinary
	skills to meet current and future needs of industry
PSO 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
PSO 3	Apply the Signal processing techniques to synthesize and realize the issues related to real time
	applications

**Course Instructor** 

**Course Coordinator** 

**Module Coordinator** Dr. G. Srinivasulu Head of the Department

Dr. T. Satyanarayana

Dr. T. Satyanarayana

Dr. Y. Amar Babu

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)



Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230. Phone: 08659-222933, Fax: 08659-222931

#### **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **COURSE HANDOUT**

#### PART-A

Name of Course Instructor: Course Name & Code : L-T-P Structure : Program/Sem/Sec : A.Y. : **Mr. B. SREENIVASA REDDY** PCS LAB, 20FE51 **0-0-2** ECE-C- I SEM 2022-23

Credits: 01

PREREQUISITE: NIL

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** To improve the proficiency of students in English with an emphasis on better communication in formal and informal situations; Develop speaking skills required for expressing their knowledge and abilities and to face interviews with confidence.

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

C01	Introduce one-self and others using appropriate language and details.	L2
CO2	Comprehend short talks and speak clearly on a specific topic using	L2
CO3	Report effectively after participating in informal discussions ethically.	L1
CO4	Interpret data aptly, ethically & make oral presentations without	L3

#### Syllabus: Professional Communication Lab (PCS) shall have two parts:

- Computer Assisted Language Learning (CALL) Lab for 60 students with 60 systems, LAN facility and English language software for self-study by learners.
- Interactive Communication Skills (ICS) Lab. with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo – audio & video system and camcorder etc.

#### Exercise-I

CALL Lab: Understand- Sentence structure.

**ICS Lab: Practice -**Listening: Identifying the topic, the context and specific information, Speaking: Introducing oneself and others.

#### Exercise-II

CALL Lab: Understand- Framing questions.

**ICS Lab: Practice-** Listening: Answering a series of questionsaboutmainideaandsupportingideasafterlisteningtoaudiotext.

Speaking: Discussing in pairs/small groups on specific topics; Delivering short structured talks using suitable cohesive devices (JAM)

#### Exercise-III

CALL Lab: Understand- Comprehension practice-Strategies for Effective Communication

**ICS Lab: Practice** - Listening: Listening for global comprehension and Summarizing Speaking: Discussing specific topics in pairs/small groups, reporting what is discussed

#### Exercise-IV

**CALL Lab: Understand-** Features of Good Conversation–Strategies for Effective Communication.

**ICS Lab: Practice -**Listening: making predictions while listening to conversations/transactional dialogues with/without video Speaking: Role – plays – formal & informal – asking for and giving information/directions/instructions/suggestions

#### Exercise-V

CALL Lab: Understand- Features of Good Presentation, Methodology of Group Discussion

ICS Lab: Practice –Introduction to Group Discussions.

Listening: Answering questions, identifying key terms and understanding concepts.

Speaking: Formal Oral & Poster presentations on topics from academic contexts without the use of PPT.

#### Lab Manual:

1. Prabhavati .Y & etal, "English All Round–Communication Skills for Undergraduate Learners", Orient Black Swan, Hyderabad, 2019.

#### Suggested Software:

- 1. Digital Mentor: Globarena, Hyderabad, 2005
- 2. Sky Pronunciation Suite: Young India Films, Chennai, 2009
- 3. Mastering English in Vocabulary, Grammar, Spelling, Composition, Dorling Kindersley, USA, 2001
- 4. Dorling Kindersley Series of Grammar, Punctuation, Composition, USA, 2001
- 5. Oxford Talking Dictionary, The Learning Company, USA, 2002
- 6. Learning to Speak English- 4CDs. The Learning Company, USA, 2002
- 7. Cambridge Advanced Learners English Dictionary (CD).Cambridge University Press, New Delhi, 2008.

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

COs	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1					3					3	3				
CO2					3					3	3				
CO3					3					3	3				
CO4					3					3	3				
		1	- Low			2	–Med	ium			3	- High			

#### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly			
1.	Introduction to syllabus	03	21.10.2022		TLM4				
2.	Self Introduction & Introducing others	03	28.10.2022		TLM4				
3.	Self Introduction & Introducing others	03	04.11.2022		TLM4				
4.	JAM- I(Short and Structured Talks)	03	11.11.2022		TLM4				
5.	JAM-II(Short and Structured Talks)	03	18.11.2022		TLM4				
6.	Role Play-I(Formal and Informal)	06	25.11.2022 02.12.2022		TLM4				
7.	Role Play-II (Formal and Informal)	03	09.12.2022		TLM4				
8.	Group Discussion-I (Reporting the discussion)	06	23.12.2022 30.12.2022		TLM4, TLM6				
9.	Group Discussion-II	06	06.01.2023 20.01.2023		TLM4, TLM6				
10.	Oral & Poster Presentation	06	27.01.2023 03.02.2023		TLM2, TLM4				
11.	Lab Internal Exam	03	10.02.2022		TLM4				
No.	No. of classes required to complete Syllabus: 45 No. of classes taken:								

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

# PART-C

#### **EVALUATION PROCESS (R20 Regulation):**

Evaluation Task	Marks
Cumulative Internal Examination (CIE): M	<mark>15</mark>
Semester End Examination (SEE)	<mark>35</mark>
Total Marks = CIE + SEE	50

#### **PROGRAMME OUTCOMES (POs):**

PO 1	<b>Engineering knowledge</b> : Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering
PO 2	problems reaching substantiated conclusions using first principles of mathematics, natural sciences,
	and engineering sciences.
	Design/development of solutions: Design solutions for complex engineering problems and design
PO 3	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.
	Conduct investigations of complex problems: Use research-based knowledge and research methods
PO 4	including design of experiments, analysis and interpretation of data, and synthesis of the information
	to provide valid conclusions.
	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern
PO 5	engineering and IT tools including prediction and modelling to complex engineering activities with an
	understanding of the limitations
	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal,
PO 6	health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional
	engineering practice
<b>DO 7</b>	environment and sustainability: Understand the impact of the professional engineering solutions in
PO /	development
	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and porms of the
PO 8	engineering practice.
	Individual and team work: Function effectively as an individual, and as a member or leader in diverse
PO 9	teams, and in multidisciplinary settings.
	Communication: Communicate effectively on complex engineering activities with the engineering
PO 10	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
	Project management and finance: Demonstrate knowledge and understanding of the engineering and
PO 11	management principles and apply these to one's own work, as a member and leader in a team, to
	manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in
	independent and life-long learning in the broadest context of technological change.

	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. B. Sreenivasa Reddy	Dr. B. Samrajya Lakshmi	Dr. B. Samrajya Lakshmi	Dr. A. Rami Reddy
Signature				



# 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., I-Sem.,ECE -C
ACADEMIC YEAR	•	2021-22
<b>COURSE NAME &amp; CODE</b>	•	APPLIED PHYSICS LAB -20 FE54
L-T-P STRUCTURE	•	0-0 -3
COURSE CREDITS	•	1.5
COURSE INSTRUCTOR	•	Mrs.N.Aruna
COURSE COORDINATOR	•	Mrs.P.Vijaya Sirisha

# Pre-requisites : NIL

**Course Educational Objective :**This course enables the students to acquire theoretical ideas, Analytical techniques and graphical analysis by completing a host of experiments with the procedures and observational skills for appropriate use of simple and complex apparatus.

**Course Outcomes:** At the end of the course, the student will be able to :

Co1.	Analyze the wave characteristics of Light.

Co2.	Estimate the magnetic field using Stewart's and Gee's apparatus
Со3.	Verify the characteristics of Semiconductor Diodes.
Co4.	Determine the acceptance angle and numerical aperture of optical fibre.
Co 5.	Improve report writing skills, Individual and team work with Ethical values

# COURSE ARTICULATION MATRIX (Correlation between Cos & POs, PSOs

	Applied Physics Lab													
COURSE DESIGNED BY	FRESH	FRESHMAN ENGINEERING DEPARTMENT												
Course Outcomes	Programme Outcomes													
PO's ➡	1	2	3	4	5	6	7	8	9	10	11	12		
C01.	3	3	1	1								1		
CO2.	3	3	1	1								1		
CO3.	3	3	1	1								1		
CO4.	3	3	1	1								1		

CO5.							2	2	2		
CATEGORY	BASIC SCIENCES										
APPROVAL			APP	ROVED	BY ACA	DEMIC (	COUNCI	L, 2017.			

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- B**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completio n	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	CEO'S &CO'S Introduction	3	17-10-202 2		TLM4	1,2,3,4	T1	
2.	Demonstration	3	31-10-202 2		TLM4	CO1, CO2, CO3, CO4	T1	
3.	Experiment 1	3	07-11-202 2		TLM4	CO1, CO2, CO3, CO4	T1	
4.	Experiment 2	3	14-11-202 2		TLM4	CO1, CO2, CO3, CO4	T1	
5.	Experiment 3	3	21-11-202 2		TLM4	CO1, CO2, CO3, CO4	T1	
6.	Experiment 4	3	28-11-202 2		TLM4	CO1, CO2, CO3, CO4	T1	
7.	Experiment 5	3	05-12-202 2		TLM4	CO1, CO2, CO3, CO4	T1	
8.	Demonstration	3	12-12-202 2		TLM4	CO1, CO2, CO3, CO4	T1	
9.	Experiment 6	3	19-12-202 2		TLM4	CO1, CO2, CO3, CO4	T1	
10.	Experiment 7	3	26-12-202 2		TLM4	CO1, CO2, CO3, CO4	T1	
11.	Experiment 8	3	02-01-202 3		TLM4	CO1, CO2, CO3, CO4	T1	
12.	Experiment 9	3	09-01-202 3		TLM4	CO1, CO2, CO3, CO4	T1	
13.	Experiment 10	3	23-01-202 3		TLM4	CO1, CO2, CO3, CO4	T1	
14.	Internal Exam	3	30-01-202 3		TLM4	CO1, CO2, CO3, CO4	T1	
15.	Internal Exam	3	06-01-202 3		TLM4	CO1, CO2, CO3, CO4	T1	
No. c requi lab	of classes red to complete	45			No. of clas	ses taken:		

# PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Graduates of Information Technology programme will be:

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

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

(9). Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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

(11). Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and

leader in a team, to manage projects and in multidisciplinary environments.

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

# **PROGRAM SPECIFIC OUTCOMES (PSOs)**:

Graduate of the 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

N.Aruna/Dr.PVN Kishore	Mrs.P.Vijaya Sirisha	Dr S.Yusub	Dr A. Ramireddy
Course Instructor	Course Coordinator	Module Coordinator	HOD



#### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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# COURSE HANDOUT PART-A

Name of Course Instructor	: Mr. K.V.Ashok/Mr. Ch. Mallikharjuna	Rao/Mrs. M. Ramya Harika
Course Name & Code	: Basic Electrical Engineering Lab	
L-T-P Structure	: 0-0-3	Credits: 1.5
Program/Sem/Sec	: B.Tech., ECE., I-Sem., Section- C	A.Y : 2022-23

#### **PREREQUISITE:** Nil

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** This is a course to expose basic circuit concepts, circuit modeling and methods of circuit analysis in time domain and frequency domain for solving simple circuits including DC and AC circuit theory and network theorems.

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

C01	<b>Interpret</b> the behavior of passive components of electrical circuits, inductance of magnetic circuits, two port networks and principle of DC machines using fundamental electrical laws and mathematical models. <b>(Understand – L2)</b>
CO2	<b>Apply</b> Kirchhoff's laws, Network theorems to verify the linear electrical circuits using fundamental electrical laws and mathematical equations. <b>(Apply – L3)</b> .
CO3	<b>Examine</b> the active & reactive powers of single phase electrical circuits and resonant frequency, bandwidth & quality factor of electrical circuits. <b>(Apply – L3)</b>
<b>CO4</b>	Adapt effective Communication, presentation and report writing skills.(Apply – L3)

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

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
C01	3	2	1	1	-	-	-	-	-	2	-	-	-	-	2
CO2	3	3	1	1	-	-	-	-	-	2	-	-	-	-	2
CO3	3	2	1	1	-	-	-	-	-	2	-	-	-	-	3
CO4	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-
<b>1</b> - Low						2	-Medi	ium			3	- High			

#### **TEXT BOOKS:**

T1 Ravish R Singh, "Network Analysis and synthesis", Tata McGraw Hill Pvt Ltd, New Delhi.2013

T2 B.L Theraja, A.K. Theraja, "Electrical Technology in S.I. UNITS. Volume II. AC & DC MACHINES"Published by S. Chand & Company Ltd 2016.

#### **REFERENCE BOOKS:**

- **R1** M.S Naidu and S. Kamakshaiah, "Introduction to Electrical Engineering", TMH Publication, 3<sup>rd</sup> edition 2017.
- **R2** A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7<sup>th</sup> Edition, New Delhi 2017.

### PART-B

# COURSE DELIVERY PLAN (LESSON PLAN): BATCH-I

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.	Demo on Lab Experiments	3	22-10-2022		TLM1	
2.	Identify and test passive elements in linear electrical circuits.	3	29-10-2022		TLM4	
3.	Determination of closed Loop voltages and node currents using Kirchhoff's laws.	3	05-11-2022		TLM4	
4.	Determination of node voltages and branch currents using voltage division and current division rules.	3	19-11-2022		TLM4	
5.	Determination of Self inductance, Mutual inductance and Coefficient coupling factor of a Magnetic circuits.	3	26-11-2022		TLM4	
6.	Determination of Active and Reactive powers in a Single phase series R-L/R-C circuits.	3	03-12-2022		TLM4	
7.	Determination of Resonant frequency, Bandwidth and Quality factor of RLC circuits	3	24-12-2022		TLM4	
8.	Analysis of linear circuit branch response using Superposition theorem.	3	31-12-2022		TLM4	
9.	Determination and verification of Voltage & Resistance using Thevenin's theorems, and current & resistance using Norton's theorem	3	07-01-2023		TLM4	
10.	Determination and verification of power transfer using Maximum power transfer theorem	3	21-01-2023		TLM4	
11.	Determination and verification of Z parameters and Y Parameters of two port network	3	28-01-2023		TLM4	
12.	Internal Lab Examination	3	04-02-2023	No of classe	c takon.	
NO. 0	or classes required to complete : 33			NO. OF CLASSE	s taken:	

# COURSE DELIVERY PLAN (LESSON PLAN): BATCH-II

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.	Demo on Lab Experiments	3	19-10-2022		TLM4					
2.	Identify and test passive elements in linear electrical circuits.	3	26-10-2022		TLM4					
3.	Determination of closed Loop voltages and node currents using Kirchhoff's laws.	3	02-11-2022		TLM4					
4.	Determination of node voltages and branch currents using voltage division and current division rules.	3	09-11-2022		TLM4					
5.	Determination of Self inductance, Mutual inductance and Coefficient coupling factor of a Magnetic circuits.	3	16-11-2022		TLM4					
6.	Determination of Active and Reactive powers in a Single phase series R-L/R-C circuits.	3	23-11-2022		TLM4					
7.	Determination of Resonant frequency, Bandwidth and Quality factor of RLC circuits	3	30-11-2022		TLM4					
8.	Analysis of linear circuit branch response using Superposition theorem.	3	07-12-2022		TLM4					
9.	Determination and verification of Voltage & Resistance using Thevenin's theorems, and current & resistance using Norton's theorem	3	21-12-2022		TLM4					
10.	Determination and verification of power transfer using Maximum power transfer theorem	3	04-01-2023		TLM4					
11.	Determination and verification of Z parameters and Y Parameters of two port network	3	18-01-2023		TLM4					
12.	Internal Lab Examination	3	08-02-2023							
No.	No. of classes required to complete : 33 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 = A	1,2,3,4,5,6,7,8	A=05
Record = <b>B</b>	1,2,3,4,5,6,7,8	B=05
Internal Test = <b>C</b>	1,2,3,4,5,6,7,8	C = 05
Cumulative Internal Examination : A + B + C = 15	1,2,3,4,5,6,7,8	15
Semester End Examinations = D	1,2,3,4,5,6,7,8	D = 35
Total Marks: $A + B + C + D = 50$	1,2,3,4,5,6,7,8	50

# 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	<b>Problem analysis</b> : 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	<b>Design/development of solutions</b> : Design solutions for complex engineering
	problems and design system components or processes that meet the specified
	cultural, societal, and environmental considerations
PO 4	<b>Conduct investigations of complex problems</b> : 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
PU 5	<b>Modern tool usage</b> : Create, select, and apply appropriate techniques, resources, and modern orginaering and IT tools including prediction and modelling to
	complex engineering activities with an understanding of the limitations
PO 6	<b>The engineer and society</b> : 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	<b>Environment and sustainability</b> : Understand the impact of the professional
	the knowledge of and need for sustainable development
PO 8	<b>Ethics:</b> 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
DO 10	member or leader in diverse teams, and in multidisciplinary settings
PO 10	<b>Communication</b> : Communicate effectively on complex engineering activities
	comprehend and write effective reports and design documentation make
	effective presentations, and give and receive clear instructions
PO 11	<b>Project management and finance</b> : 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
PO 12	multialsciplinary environments
1012	to engage in independent and life-long learning in the broadest context of
	technological change

# **PROGRAMME SPECIFIC OUTCOMES (PSOs):**

PSO 1	Design and develop modern communication technologies for building the inter								
	disciplinary skills to meet current and future needs of industry								
<b>PSO 2</b>	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								
<b>PSO 3</b>	Apply the Signal processing techniques to synthesize and realize the issues related								
	to real time applications								

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr. K.V. Ashok	Mr. G. Venkata Rao	Dr. G. Srinivasulu	Dr. Y. Amar Babu

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)



Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230. Phone: 08659-222933, Fax: 08659-222931

### **DEPARTMENT OF ECE**

## COURSE HANDOUT

### PART-A

Name of Course Instructor:B V N R Siva Kumar, Asso. ProfessorCourse Name & Code: EDC Lab-20EC51L-T-P Structure: 0-0-3Program/Sem/Sec: B. Tech. I-Sem., ECE C Sec

**Regulation**: R20 **Credits:** 1.5 **A.Y.:** 2022-23

**PREREQUISITE:** Nil

**COURSE EDUCATIONAL OBJECTIVES (CEOs)**: This course introduces the characteristics and applications of semiconductor devices; emphasis is placed on characteristics and testing practically to strengthen the knowledge.

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

CO1	Demonstrate the characteristics of Diodes, BJT, FET, Voltage regulators, Diode applications
<b>CO3</b>	Analyze the device parameters of Diodes, Bipolar Junction Transistors, and Field Effect
02	Transistors for its electrical parameters using VI characteristics
CO3	Apply the knowledge of diodes, Capacitors and transistors for the realization of rectifiers,
	regulators, Clippers and Clampers circuits
CO4	Adapt effective Communication, presentation and report writing skills

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

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2	PSO3
C01	2	1	-	-	-	-	-	-	-	-	-	-	-	1	-
CO2	3	1	-	-	-	-	-	-	-	-	1	1	-	2	-
CO3	3	1	1	-	-	-	-	-	-	-	-	-	-	2	-
CO4	-	-	-	-	-	-	-	-	3	2	-	-	-	-	-
<b>1 -</b> Low						2	-Med	ium			3	- High			

**TEXTBOOKS:** 

**T1** Jacob Millman, Christos C Halkias, Electronic Devices and Circuits, Third edition, Tata McGraw Hill, Publishers, New Delhi. 2012

#### **REFERENCE BOOKS:**

**R1** Ben Streetman and Sanjay Banerjee, Solid State Electronic Devices, Fourth edition, Prentice Hall Publishers, 2014

### PART-B

#### **COURSE DELIVERY PLAN (LESSON PLAN):**

S.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
NO.	(Experiment Name)	Required	Completion	Completion	Methods	Weekly
1.	COs, Identification of components, Active and Passive Devices. Study		02.11.2022			
	and operation of RPS, DMM, CRO and Function generator	3	05.11.2022			
2.	Determination of Cut-in Voltage, Forward and Reverse resistances of PN	2	09.11.2022			
	Junction diode using Characteristics	3	12.11.2022			

3.	Realiz	ation and performance	2		23.11.	2022			
	and w	ithout Capacitor filter	3		19.11.	2022			
4.	Realiz	ation and performance	_		30.11.	2022			
	evalua and w	ition of Full wave rectifier with ithout Capacitor filter	3		26.11.	2022			
5.	Analys	sis of Transistor CB			07.12.	2022			
	Config Outpu gains (	uration for its Input and t resistances and Current using VI Characteristics	3		03.12.	2022			
6.	Analys	sis of Transistor CE			14.12.	2022			
	Outpu	t resistances and Current	3		10.12.	2022			
	gains	using VI Characteristics			10.12.				
7.	Analys	sis of Drain and Transfer cteristics of Field Effect			21.12.	2022			
	Transi	stor for its Drain Resistance,	3		24 12	2022			
	Transo	Transconductance and Amplification			24.12.	2022			
8.	Deteri	Determination of Breakdown			28.12.	2022			
	voltage of Zener diode and Design of		3		31.12.	2022			
9.	Desigr	Design and Realization of Series			04.01.	2023			
	Voltag	e Clippers with and without	3		07.12.	2022	-		
10	bias vo Design	Ditage			11 01	2023			
10.	Voltag	e Clippers with and without	3		21.01	2023			
	bias vo	oltage			21.01.	2025			
11.	Desigr	h and Realization of Voltage	3		18.01.	2023	-		
	capacitors				28.01.	2023			
12.	Realization of Voltage multiplier			25.01.	2023				
	using	Clampers.	3		04.02.	2023			
No. c	of classe	es required to complete : 24					No. of classe	s taken:	
Теа	aching	Learning Methods							
TI	LM1	Chalk and Talk		TI	LM4	Dem	onstration (I	Lab/Field V	/isit)
TI	L <b>M2</b>	РРТ		TI	TLM5ICT (NPTEL/Swayam Prabha/MOOCS)				
TI	LM3	Tutorial		TI	<b>FLM6</b> Group Discussion/Project				

PART-C

### EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Expt. no's	Marks
Day to Day work $= \mathbf{A}$	1,2,3,4,5,6,7,8	A=05
Record $=$ <b>B</b>	1,2,3,4,5,6,7,8	B=05
Internal Test = $\mathbf{C}$	1,2,3,4,5,6,7,8	C = 05
Cumulative Internal Examination : A + B + C = 15	1,2,3,4,5,6,7,8	15
Semester End Examinations = D	1,2,3,4,5,6,7,8	D = 35
Total Marks: $A + B + C + D = 50$	1,2,3,4,5,6,7,8	50

# PART-D

## PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

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

<b>PEO 2</b>	To Function professionally in the rapidly changing world with advances in technology	
PEO 3	To Contribute to the needs of the society in solving technical problems using	
	Electronics & Communication Engineering principles, tools and practices	
<b>PEO 4</b>	To Exercise leadership qualities, at levels appropriate to their experience, which	
	addresses issues in a responsive, ethical, and innovative manner?	
PROGRAMME OUTCOMES (POs):		
PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering	
	fundamentals, and an engineering specialization to the solution of complex	
	engineering problems	
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze	
	complex engineering problems reaching substantiated conclusions using first	
	principles of mathematics, natural sciences, and engineering sciences	
PO 3	Design/development of solutions: Design solutions for complex engineering	
	problems and design system components or processes that meet the specified needs	
	with appropriate consideration for the public health and safety, and the cultural,	
<b>DO 4</b>	Societal, and environmental considerations	
PU 4	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	
105	modern engineering and IT tools including prediction and modelling to complex	
	engineering activities with an understanding of the limitations	
PO 6	<b>The engineer and society</b> : 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	<b>Ethics</b> : Apply ethical principles and commit to professional ethics and responsibilities	
	and norms of the engineering practice	
PO 9	<b>Individual and team work</b> : Function effectively as an individual, and as a member or	
50.40	leader in diverse teams, and in multidisciplinary settings	
PO 10	<b>Communication</b> : 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	
PO 11	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the	
1011	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):		
	Design and develop modern communication technologies for building the inter-	
1021	Design and develop modern communication technologies for building the inter	

	disciplinary skills to meet current and future needs of industry
<b>PSO 2</b>	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
<b>PSO 3</b>	Apply the Signal processing techniques to synthesize and realize the issues related to
	real time applications