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 **Credits:** 02
Program/Sem/Sec : ECE-A –I SEM
A.Y. : 2021-22

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 &Writingskills.

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	Editthesentences/shorttextsbyidentifyingbasicerrorsofgrammar/ 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.

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		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			
1 - Low						2 –Medium						3 - High			

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	13-12-2021		TLM2	
2.	Proposal to Girdle The Earth by Nellie Bly	02	15-12-2021 18-12-2021		TLM2	
3.	Reading: Skimming for main idea ; Scanning for specific information	01	20-12-2021		TLM2	
4.	Content words and Function words	01	22-12-2021		TLM2	
5.	Word forms – verbs; Adjectives & adverbs	01	27-12-2021		TLM2	
6.	Nouns – countable & uncountable, singular and plural nouns Word order in sentences, "Wh"	01	29-12-2021		TLM2	

	questions					
7.	Writing: Paragraph writing, Paragraph analysis	02	03-01-2022 05-01-2022		TLM2 TLM6	
No. of classes required to complete UNIT-I: 09				**No. of classes taken:**		

UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	The District School As It Way by One Who Went to it - Warren Burton	02	08-01-2022 10-01-2022		TLM2	
9.	Identifying sequence of ideas	01	17-01-2022		TLM2	
10.	Cohesive devices: linkers /signposts/transition signals	01	19-01-2022		TLM2	
11.	Synonyms meanings of words / Phrases in the context	01	22-01-2022		TLM2	
12.	Essay Writing - Memo drafting	03	24-02-2021 29-02-2021 31-01-2022		TLM2 TLM6	
No. of classes required to complete UNIT-II: 08				**No. of classes taken:**		

UNIT-III:

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.	The Future of Work	02	02-02-2022 05-02-2022		TLM2 TLM6	

14.	Making basic inferences, Strategies to uses text clues for comprehension	01	14-02-022		TLM2	
15.	Verbs :tenses, reporting verbs for academic purpose	02	16-02-022 19-02-022		TLM2	
16.	Summarizing rephrasing what is read	01	23-02-022		TLM2	
17.	avoiding redundancies and repetitions - Abstract Writing	02	26-02-022 28-02-022		TLM2 TLM6	
No. of classes required to complete UNIT-III: 08				No. of classes 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	01	02-03-022		TLM2 TLM2	
19.	APJ Abdul Kalam	01	05-03-022		TLM2	
20.	Direct-Indirect speech	02	07-03-022 09-03-022		TLM2	
21.	Articles and their omission	01	12-03-022		TLM2	
22.	E-mail drafting	02	14-03-022 16-03-022		TLM2 TLM6	
No. of classes required to complete UNIT-IV: 06				No. of classes taken:		

UNIT-V:

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.	C.V.Raman	01	19-03-022		TLM2	
24.	C.V.Raman	01	21-03-022		TLM2	
25.	Subject – Verb agreement	01	23-03-022		TLM2	
26.	Prepositions	01	26-03-022		TLM2	
27.	Formal Letter Writing	02	28-03-022 30-03-022		TLM2 TLM6	
No. of classes required to complete UNIT-V: 06				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 (R17 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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				

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DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. K. Bhanu Lakshmi
Course Name & Code : Differential Equations&20FE03
L-T-P Structure : 3-2 -0 **Credits:4**
Program/Sem/Sec : I B.Tech/I sem/A **A.Y.:** 2021 - 22

PREREQUISITE: Nil

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): At the end of the course, 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.

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

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

TEXTBOOKS:

T1 Dr. B.S. Grewal, "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, New Delhi, 2012.

T2 Dr. B. V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

REFERENCE BOOKS:

R1 M. D. Greenberg, "Advanced Engineering Mathematics", 2nd Edition, TMH Publications, New Delhi, 2011.

R2 Erwin Kreyszig, "Advanced Engineering Mathematics", 8th Edition, John Wiley & sons, New Delhi, 2011.

R3 W.E. Boyce and R. C. Diprima, " Elementary Differential Equations" , 7th Edition, John Wiley & sons, New Delhi,2011.

R4 S. S. Sastry, " Introductory Methods of Numerical Analysis" 5th Edition, PHI Learning Private Limited, New Delhi, 2012.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Ordinary 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	HOD Sign Weekly
1.	Introduction to the course, Course Outcomes	1	13/12/2021		TLM1	
2.	Introduction to UNIT I	1	14/12/2021		TLM1	
3.	Formation of Differential Equations	1	15/12/2021		TLM1	
4.	Exact DE	1	16/12/2021		TLM1	
5.	Non-exact DE Type I	1	17/12/2021		TLM1	
6.	Non-exact DE Type II	1	20/12/2021		TLM1	
7.	Non-exact DE Type III	1	21/12/2021		TLM1	
8.	**TUTORIAL 1**	1	22/12/2021		TLM3	
9.	Non-exact DE Type IV	1	23/12/2021		TLM1	
10.	Orthogonal Trajectories (Cartesian)	1	24/12/2021		TLM1	
11.	Orthogonal Trajectories (polar)	1	27/12/2021		TLM1	
12.	Orthogonal Trajectories (polar)	1	28/12/2021		TLM1	
13.	Problems	1	30/12/2021		TLM1	
14.	**TUTORIAL 2**	1	29/12/2021		TLM3	
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II: Linear Differential Equations of Higher Order

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Introduction to UNIT II	1	31/12/2021		TLM2	
16.	Solving a homogeneous DE	1	03/01/2022		TLM1	
17.	Finding Particular Integral, P.I for e^{ax+b}	1	04/01/2022		TLM1	
18.	P.I for Cos bx, or sin bx	1	05/01/2022		TLM1	
19.	P.I for Cos bx, or sin bx		06/01/2022			
20.	P.I for polynomial function	1	07/01/2022		TLM1	
21.	P.I for $e^{ax+b}v(x)$	1	10/01/2022		TLM1	
22.	P.I for $e^{ax+b}v(x)$	1	11/01/2022		TLM1	
23.	P.I for $x^k v(x)$	1	12/01/2022		TLM1	
24.	P.I for $x^k v(x)$		18/01/2022		TLM1	
25.	**TUTORIAL 3**	1	19/01/2022		TLM3	
26.	Method of Variation of parameters	1	20/01/2022		TLM1	
27.	Method of Variation of parameters	1	21/01/2022		TLM1	
28.	**TUTORIAL 4**	1	24/01/2022		TLM3	
No. of classes required to complete UNIT-II: 14				**No. of classes 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	HOD Sign Weekly
29.	Introduction to Unit-III	1	25/01/2022		TLM1	
30.	Solution by Taylor's series	1	27/01/2022		TLM1	
31.	Solution by Taylor's series	1	28/01/2022		TLM1	
32.	Picard's Method	1	31/01/2022		TLM1	
33.	Picard's Method	1	01/02/2022		TLM1	
34.	**TUTORIAL 5**	1	02/02/2022		TLM3	
35.	Euler's Method	1	03/02/2022		TLM1	
36.	REVISION	1	04/02/2022		TLM1	
37.	Modified Euler's Method	1	14/02/2022		TLM 1	
38.	Modified Euler's Method	1	15/02/2022		TLM1	
39.	Runge- Kutta Method	1	16/02/2022		TLM1	
40.	Runge- Kutta Method	1	17/02/2022		TLM1	
41.	Problems	1	18/02/2022		TLM1	
42.	**TUTORIAL 6**	1	23/02/2022		TLM3	
No. of classes required to complete UNIT-III: 14				**No. of classes 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	HOD Sign Weekly
43.	Introduction to UNIT IV	1	21/02/2022		TLM1	
44.	Generalized Mean Value Theorem, Taylor's series	1	22/02/2022		TLM1	
45.	Maclaurin's series	1	24/02/2022		TLM1	
46.	Maclaurin's series	1	25/02/2022		TLM1	
47.	Functions of several variables	1	28/02/2022		TLM1	
48.	**TUTORIAL 7**	1	02/03/2022		TLM3	
49.	Jacobians (polar, cylindrical, spherical coordinates)	1	03/03/2022		TLM1	
50.	Jacobians (polar, cylindrical, spherical coordinates)	1	04/03/2022		TLM1	
51.	Functional dependence	1	07/03/2022		TLM1	
52.	Maxima and Minima of functions of two variables	1	08/03/2022		TLM1	
53.	Maxima and Minima of functions of two variables	1	10/03/2022		TLM1	
54.	Maxima and Minima of functions of two variables	1	11/03/2022		TLM1	
55.	**TUTORIAL 8**	1	09/03/2022		TLM3	
No. of classes required to complete UNIT-IV:13				**No. of classes 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	HOD Sign Weekly
56.	Introduction to UNIT V	1	14/03/2022		TLM1	
57.	Formation of PDE by elimination of arbitrary constants	1	15/03/2022		TLM1	
58.	Formation of PDE by elimination of arbitrary constants	1	16/03/2022		TLM1	
59.	Formation of PDE by elimination of arbitrary functions	1	17/03/2022		TLM1	
60.	Formation of PDE by elimination of arbitrary functions	1	18/03/2022		TLM1	

61.	Formation of PDE	1	21/03/2022		TLM1	
62.	**TUTORIAL 9**	1	23/03/2022		TLM3	
63.	Solving of PDE	1	22/03/2022		TLM1	
64.	Lagrange's Method	1	24/03/2022		TLM1	
65.	Lagrange's Method	1	25/03/2022		TLM1	
66.	Lagrange's Method	1	28/03/2022		TLM1	
67.	**TUTORIAL 10**	1	30/03/2022		TLM1	
68.	Problems	1	29/03/2022			
69.	**Revision**	1	31/03/2022			
70.	**Revision**	1	01/04/2022			
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	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. K. Bhanu Lakshmi**	**Dr. A. Rami Reddy**	**Dr. A. Rami Reddy**	**Dr. A. Rami Reddy**
Signature				

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

PROGRAM : **B.Tech., I-Sem., ECE-A**

ACADEMIC YEAR : **2021-22**

COURSE NAME & CODE : **APPLIED PHYSICS & 20FE07**

L-T-P STRUCTURE : **4-0-0**

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	**Define** 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.
CO 4	**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	**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**
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)**												

BOS APPROVED TEXT BOOKS:

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

BOS APPROVED REFERENCE BOOKS:

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

WEB REFERENCES AND E-TEXT BOOKS

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

TEACHING LEARNING METHODS			
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):

UNIT-I: INTERFERENCE & DIFFRACTION

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Introduction to the Subject, Course Outcomes	1			**TLM-2**		
2.	Superposition of waves, Coherence, Conditions for Interference	1			**TLM-3**		
3.	Interference from thin films	1			**TLM-1**		
4.	Newton's rings	1			**TLM-4**		

5.	Michelson's interferometer	1			**TLM-2**		
6.	Introduction – Diffraction, Types	1			**TLM-3**		
7.	Single slit diffraction	1			**TLM-1**		
8.	Diffraction – Circular aperture, Diffraction grating	1			**TLM-4**		
9.	Resolving power of Grating	1			**TLM-4**		
10.	Problems & Assignment/Quiz	1			**TLM-3**		
No. of classes required to complete UNIT-I: 10				No. of classes taken:			

UNIT-II: LASERS & OPTICAL FIBERS

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks
1.	Principle of laser, Absorption, Spontaneous and Stimulated emission	1			**TLM-2**		
2.	Einstein Coefficients	1			**TLM-1**		
3.	Nd-YAG Laser, He-Ne gas Laser	1			**TLM-2**		
4.	Applications of LASERS	1			**TLM-5**		
5.	Optical Fiber principle, Structure of optical fiber	1			**TLM-2**		
6.	Numerical aperture and Acceptance angle	1			**TLM-1**		
7.	Types of optical fibers	1			**TLM-1**		
8.	Applications and Advantages of Optical Fibers	1			**TLM-5**		
9.	Problems & Assignment/Quiz	1			**TLM-3**		
No. of classes required to complete UNIT-II: 09				No. of classes taken:			

UNIT-III: PRICIPLES OF QUANTUM 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			**TLM-5**		
2.	Davisson and Germer Experiment, Physical significance of wave function	1			**TLM-2**		
3.	Schrodinger time dependent & independent wave equations	1			**TLM-1**		
4.	Particle in a box	1			**TLM-1**		
5.	Problems & Assignment/Quiz	1			**TLM-3**		
6.	Classical free electron theory-postulates, Success & Failures	1			**TLM-2**		
7.	Expression for electrical conductivity and drift velocity	1			**TLM-1**		
8.	Fermi-Dirac distribution function-Temperature dependence	1			**TLM-2**		
9.	Classification of Solids on the basis of Band theory	1			**TLM-6**		
10.	Problems & Assignment/Quiz	1			**TLM-3**		
No. of classes required to complete UNIT-III: 10				No. of classes taken:			

UNIT-IV : SEMICONDUCTOR PHYSICS

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign	Remarks

1.	Introduction - Classification of semiconductors	1			**TLM-6**		
2.	Conductivity of Intrinsic and Extrinsic semiconductors	1			**TLM-1**		
3.	Drift and Diffusion Current, Einstein relation	1			**TLM-2**		
4.	Hall Effect and Hall Coefficient	1			**TLM-5**		
5.	Direct band gap and indirect band gap semiconductors	1			**TLM-2**		
6.	Solar Cell, Applications	1			**TLM-4**		
7.	Problems & Assignment/Quiz	1			**TLM-3**		
No. of classes required to complete UNIT-IV: 07				No. of classes taken:			

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			**TLM-3**		
2.	Classification of magnetic materials – Dia, para & Ferro	1			**TLM-6**		
4.	Hysteresis loop, soft and hard magnetic materials	1			**TLM-2**		
5.	Applications of magnetic materials	1			**TLM-2**		
6.	Basic Definitions, Electronic polarization	1			**TLM-1**		
7.	Ionic & Orientation polarization	1			**TLM-1**		
9.	Local field, Clausius Mosotti equation	1			**TLM-1**		
10.	Applications of dielectric materials	1			**TLM2**		
11.	Problems & Assignment/Quiz	1			**TLM-3**		
No. of classes required to complete UNIT-V: 11				No. of classes taken:			

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			**TLM-2**		
2.	Revision of Unit-2	1			**TLM-2**		
3.	Revision of Unit-3	1			**TLM-2**		
4.	Revision of Unit-4	1			**TLM-2**		
5.	Revision of Unit-5	1			**TLM-2**		
6.	Revision	1			**TLM-2**		
No. of classes required for Revision: 06				No. of classes taken:			

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):

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

Course Instructor	Course Coordinator	Module Coordinator	HOD
N. T. SARMA	**DR. S. YUSUB**	**DR. S. YUSUB**	**DR. A. RAMI REDDY**

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. G. Srinivasulu, Professor

Course Name & Code	**:** EDC-20EC01	**Regulation**: R20
L-T-P Structure	**:** 3-0-0	**Credits:** 03
Program/Sem/Sec	: B. Tech. I-Sem., ECE A Sec	**A.Y.:** 2021-22

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	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	-
1 - Low			**2** –Medium					**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 Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to course, Course Outcomes, Introduction to UNIT-I	1	13.12.2021			
2.	Qualitative theory of the p-n Junction	1	14.12.2021			
3.	Diode current equitation	1	17.12.2021			
4.	The Current components in a p-n Diode	1	19.12.2021			
5.	The Volt- Ampere Characteristic	1	20.12.2021			
6.	Diode Capacitance-Transition Capacitance	1	21.12.2021			
7.	Diffusion Capacitance	1	22.12.2021			
8.	Operation and characteristics of Zener Diode	1	24.12.2021			
9.	Tunnel Diode	1	27.12.2021			
10.	Solar cell	1	28.12.2021			
11.	UJT	1	29.12.2021			
12.	SCR	1	31.12.2021			
13.	Assignment-I	1	03.01.2022			
No. of classes required to complete UNIT-I: 13				**No. of classes 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
14.	Introduction to Power supplies	1	04.01.2022			
15.	Full wave Rectifiers	1	05.01.2022			
16.	Ripple removal using Capacitive	1	07.01.2022			
17.	Inductive	1	08.01.2022			
18.	L section	1	10.01.2022			
19.	π section filters	1	17.01.2022			
20.	Voltage Regulator using Zener diode	1	18.01.2022			
21.	Clippers	1	19.01.2022			
22.	Clampers	1	21.01.2022			
23.	Assignment-II	1	22.01.2022			
No. of classes required to complete UNIT-II: 10				**No. of classes 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
24.	BJT-construction	1	24.01.2022			
25.	Different regions of operations	1	25.01.2022			
26.	Transistor Current components	1	28.01.2022			
27.	Emitter Efficiency, Transport Factor, Large Signal Current Gain	1	29.01.2022			
28.	Input and Output characteristics of CB Configuration	1	07.02.2022			
29.	Input and Output characteristics of CE Configuration	1	08.02.2022			
30.	Input and Output characteristics of CC Configuration	1	09.02.2022			
31.	Relation between α , β and γ	1	11.02.2022			
32.	Ebers-Moll Model.	1	12.02.2022			
33.	**Assignment-III**	1	14.02.2022			
No. of classes required to complete 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	16.02.2022			
35.	Classification of FET	1	18.02.2022			
36.	Comparison between FET and BJT	1	19.02.2022			
37.	Drain and Transfer Characteristics of n-channel JFET	1	21.02.2022			
38.	Drain and Transfer Characteristics of p-JFET	1	22.02.2022			
39.	n-channel enhancement MOSFET	1	23.02.2022			
40.	Drain and Transfer Characteristics nMOSFET	1	25.02.2022			
41.	Drain and Transfer Characteristics of p-channel MOSFET	1	26.02.2022			
42.	MOS Capacitor	1	28.02.2022			
43.	**Assignment-IV**	1	02.03.2022			
No. of classes required to complete UNIT-IV: 10				**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
44.	Need for biasing;	1	03.03.2022			

	Operating Point					
45.	DC and AC load line	1	05.03.2022			
46.	Stability factors S	1	07.03.2022			
47.	Stability factors S' and S"	1	08.03.2022			
48.	Biasing circuits-Fixed bias	1	09.03.2022			
49.	Problems on Fixed Bias	1	11.03.2022			
50.	Collector to Base Bias	1	12.03.2022			
51.	Problems on Collector to Base Bias	1	14.03.2022			
52.	Self Bias	1	15.03.2022			
53.	Thermal Runaway and Thermal Stability	1	16.03.2022			
54.	Bias Compensation techniques.	2	19.03.2022			
55.	FET Voltage divider bias	1	21.03.2022			
56.	Small signal equivalent of FET	1	22.03.2022			
57.	Assignment-V	1	23.03.2022			
No. of classes required to complete UNIT-V: 14				**No. of classes taken:**		

58.	Topic beyond syllabus: Realization of Level translator with transistor	1	25.03.2022		

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

PART-D

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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 Head of the Department

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DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. B Siva Hari Prasad
Course Name & Code : BASIC ELECTRICAL ENGINEERING-20EE01 **Regulation**: R20
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech. I-Sem., ECE A Sec **A.Y.:** 2021-22

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.

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	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** –Medium							**3** - 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, 3rd edition 2017.

R2 A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7th 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	13-12-21		T1,R1	
2.	Active and Passive Elements	1	16-12-21		T1,R1	
3.	Independent and Dependent Sources	1	17-12-21		T1,R1	
4.	Ohm's Law and Kirchhoff's Laws	1	18-12-21		T1,R1	
5.	Series and Parallel Connection	1	20-12-21		T1,R1	
6.	Star to Delta & Delta to Star Transformations	1	23-12-21		T1,R1	
7.	Source Transformations	1	24-12-21		T1,R1	
8.	Mesh Analysis and Problems	1	27-12-21		T1,R1	
9.	Supermesh Analysis	1	30-12-21		T1,R1	
10.	Node analysis and Problems	1	31-12-21		T1,R1	
11.	Supernode Analysis	1	03-01-22		T1,R1	
12.	Duality and Dual networks.	1	06-01-22		T1,R1	
13.	Assignment-1	1	07-01-22		T1,R1	
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 ,Mutual inductance & Coefficient of Coupling, Dot Convention	1	08-01-22		T1,R1	
15.	Series and Parallel Inductance Circuits, Coupled circuits	1	06-01-22		T1,R1	
16.	R.M.S, Average Instantaneous Values, Phase and Phase Difference	1	10-01-22		T1,R1	
17.	Behavior of R, L and C Circuits.	1	17-01-22		T1,R1	
18.	Behavior of RL Series Circuit	1	20-01-22		T1,R1	
19.	Behavior of RC Series Circuit	1	21-01-22		T1,R1	
20.	Behavior of Series RLC Circuit	1	22-01-22		T1,R2	
21.	Behavior of Parallel RLC Circuit	1	24-01-22			
22.	Reactance and Susceptance	1	27-01-22		T1,R1	
23.	Impedance and Admittance	1	28-01-22		T1,R1	
24.	Real Power, Reactive Power, Apparent Power and Power Factor	1	29-01-22		T1,R1	
25.	Assignment-2	1	31-01-22		T1,R2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken: 12**		

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
26.	Superposition Theorem	1	02-02-22		T1,R1	
27.	Thevenin's Theorem & Norton's Theorem	1	03-02-22		T1,R1	

28.	Maximum Power Transfer Theorem	1	04-02-22		T1,R1	
29.	Reciprocity Theorem & Millman's Theorem	1	05-02-22		T1,R1	
30.	Series Resonant Circuit	1	14-02-22		T1,R1	
31.	Parallel Resonant Circuit	1	17-02-22		T1,R1	
32.	Band Width & Quality Factor	1	18-02-22		T1,R1	
33.	Assignment-3	1	19-02-22		T1,R1	
No. of classes required to complete UNIT-III: 08				**No. of classes taken:08**		

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
34.	Driving point and transfer functions	1	21-02-22		T1,R1	
35.	Poles and zeros of network functions	1	24-02-22		T1,R1	
36.	Restrictions of pole and zero locations	1	25-02-22		T1,R1	
37.	Driving point and transfer functions	1	26-02-22		T1,R1	
38.	Z, Y Parameters	1	28-02-22		T1,R1	
39.	ABCD & h-parameters	1	03-03-22		T1,R1	
40.	Inter-relationship between parameters	1	04-03-22		T1,R1	
41.	Series, Parallel and Cascade Connections	1	05-03-22		T1,R1	
42.	Assignment-4	1	07-03-22		T1,R1	
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
43.	Introduction to machines	1	10-03-22		T1,R1	
44.	Generator principle, Types of Generators	1	11-03-22		T1,R1	
45.	E.M.F Equation of a Generator	1	14-03-22		T1,R1	
46.	Motor principle, Significance of back e.m.f	1	17-03-22		T1,R1	
47.	Voltage equation of a motor	1	19-03-22		T1,R1	
48.	Brake Test on the DC shunt motor	1	21-03-22		T1,R1	
49.	Working principle of Transformer	1	24-03-22		T1,R1	
50.	Ideal Transformer and E.M.F Equation of a Transformer	1	25-03-22		T1,R1	
51.	Transformer Tests (OC and SC)	1	26-03-22		T1,R1	
52.	Electrical Safety: Definitions and precautions	1	28-03-22		T1,R1	
53.	Concepts of grounding and earthing		31-03-22		T1,R1	
54.	Assignment-V	1	01-04-22		T1,R1	
No. of classes required to complete UNIT-V: 12				**No. of classes taken:12**		

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

PART-D

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr B Siva Hari Prasad**	**Mr .T.Anil Raju**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
Signature				

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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 : PCS LAB, 20FE51
L-T-P Structure : **0-0-2** **Credits:** 01
Program/Sem/Sec : ECE–A- I SEM
A.Y. : 2021-22

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

CO1	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	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 –Medium						3 - High				

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	02	17-12-2021		TLM4	
2.	Self Introduction & Introducing others	02	24-12-2021		TLM4	
3.	Self Introduction & Introducing others	02	31-12-2021		TLM4	
4.	JAM- I(Short and Structured Talks)	04	07-01-2022 21-01-2022		TLM4	
5.	JAM-II(Short and Structured Talks)	04	28-01-2022 04-02-2022		TLM4	
6.	Role Play-I(Formal and Informal)	04	11-02-2022 18-02-2022		TLM4	
7.	Role Play-II (Formal and Informal)	02	25-02-2022		TLM4	
8.	Group Discussion-I (Reporting the discussion)	02	04-03-2022		TLM4, TLM6	
9.	Group Discussion-II	02	11-03-2022		TLM4, TLM6	
10.	Oral & Poster Presentation	02	25-03-2022		TLM2, TLM4	
11.	Lab Internal Exam	02	01-04-2022			
No. of classes required to complete Syllabus: 28				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	Marks
Cumulative Internal Examination (CIE): M	30

Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and 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 comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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

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Accredited by NAAC and NBA (CSE, IT, ECE, EEE & ME) under Tier - I
College Code: 76

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

Part-A

PROGRAM	**:**	**B.Tech., I-Sem., ECE-A**
ACADEMIC YEAR	**:**	**2021-22**
COURSE NAME & CODE	**:**	**APPLIED PHYSICS LAB & 20FE54**
L-T-P STRUCTURE	**:**	**0 – 0 – 3**
COURSE CREDITS	**:**	**1.5**
COURSE INSTRUCTOR	**:**	**N. T. SARMA / N. ARUNA**
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 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**		

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 & Demonstration	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
2.	Experiment 1	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
3.	Experiment 2	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
4.	Experiment 3	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
5.	Experiment 4	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
6.	Experiment 5	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
7.	Demonstration	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
8.	Experiment 6	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
9.	Experiment 7	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
10.	Experiment 8	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
11.	Experiment 9	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
12.	Experiment 10	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
13.	**Internal Exam**	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
14.	**Internal Exam**	3			**TLM4**	CO1, CO2, CO3, CO4	T1	
No. of classes required to complete lab					No. of classes taken:			

EVALUATION PROCESS:

Evaluation Task	**Expt. no's**	**Marks**
Day to Day work = **A**	1,2,3,4,5,6,7,8,9,10	A = 05
Internal test = **B**	1,2,3,4,5,6,7,8,9,10	B = 05
Evaluation of viva voce = **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	**D = 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	**Dr. S. YUSUB**	**Dr. S. YUSUB**	**Dr. A. RAMIREDDY**

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. G. Srinivasulu, Professor
Course Name & Code : EDC Lab-20EC51 **Regulation**:R20
L-T-P Structure : 0-0-3 **Credits:** 1.5
Program/Sem/Sec : B. Tech. I-Sem., ECE A Sec **A.Y.:** 2021-22

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
CO2	Analyze the device parameters of Diodes, Bipolar Junction Transistors, and Field Effect 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	**1**	-
CO2	3	1	-	-	-	-	-	-	-	-	1	1	-	**2**	-
CO3	3	1	1	-	-	-	-	-	-	-	-	-	-	**2**	-
CO4	-	-	-	-	-	-	-	-	3	2	-	-	-	-	-
1 - Low						**2** –Medium						**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	2	20.12.2021			
2.	Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode using Characteristics	2	27.12.2021			

3.	Realization and performance evaluation of Half wave rectifier with and without Capacitor filter	2	03.01.2022			
4.	Realization and performance evaluation of Full wave rectifier with and without Capacitor filter	2	10.01.2022			
5.	Analysis of Transistor CB Configuration for its Input and Output resistances and Current gains using VI Characteristics	2	17.01.2022			
6.	Analysis of Transistor CE Configuration for its Input and Output resistances and Current gains using VI Characteristics	2	24.01.2022			
7.	Analysis of Drain and Transfer Characteristics of Field Effect Transistor for its Drain Resistance, Transconductance and Amplification factor	2	07.02.2022			
8.	Determination of Breakdown voltage of Zener diode and Design of Zener Voltage regulator	2	14.02.2022			
9.	Design and Realization of Series Voltage Clippers with and without bias voltage	2	21.02.2022			
10.	Design and Realization of Shunt Voltage Clippers with and without bias voltage	2	28.02.2022			
11.	Design and Realization of Voltage Clampers circuits using Diode and capacitors	2	07.03.2022			
12.	Realization of Voltage multiplier using Clampers.	2	14.03.2022			
No. of classes required to complete : 24				**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**	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 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 fundamentals, and an engineering specialization to the solution of complex engineering problems
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. G. Srinivasulu**	**Mr. G. Venkata Rao**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr B Siva Hari Prasad Mr. N. Dharamchari

Course Name & Code : Basic Electrical Engineering Lab- 20EE51 **Regulation**:R20

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

Program/Sem/Sec : B.Tech., ECE., I-Sem., Section-A BATCH-1 **A.Y.:** 2021-22

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	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
CO4									2	3			0	0	0
1 - Low						**2** –Medium						**3** - 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, 3rd edition 2017.

R2 A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7th Edition, New Delhi 2017.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): A Section-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.	Lab Introduction	3	13-12-21			
2.	Kirchhoff's laws	3	20-12-21			
3.	Voltage & Current division rules	3	27-12-21			
4.	Superposition theorem	3	03-01-22			
5.	Thevenin's & Norton's theorem	3	10-01-22			
6.	Maximum power transfer theorem	3	24-01-22			
7.	Active and Reactive powers in a Single-phase series R-L/R-C circuits	3	31-02-22			
8.	Resonant frequency, Bandwidth and Quality factor of RLC circuits	3	14-02-22			
9.	Z-Parameters and Y-Parameters of two port network	3	21-02-22			
10.	DC shunt motor using break test	3	28-03-22			
11.	Efficiency of the single-phase transformer using OC and SC tests	3	07-03-22			
12.	Revision Lab	3	14-03-22			
13.	Internal Lab Examination		21-03-22			
No. of classes required to complete:10				**No. of classes taken:10**		

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr.B.Siva Hari Prasad**	**Mr. T.Anil Raju**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
Signature				

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DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr B Siva Hari Prasad Mr. N. Dharamchari

Course Name & Code : Basic Electrical Engineering Lab- 20EE51 **Regulation**:R20

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

Program/Sem/Sec : B.Tech., ECE., I-Sem., Section-A BATCH-2 **A.Y.:** 2021-22

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	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
CO4									2	3			0	0	0
1 - Low			**2** –Medium							**3** - High					

TEXTBOOKS:

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

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PART-B

COURSE DELIVERY PLAN (LESSON PLAN):A Section-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.	Kirchhoff's laws	3	16-12-21			
2.	Voltage & Current division rules	3	23-12-21			
3.	Superposition theorem	3	30-12-21			
4.	Thevenin's & Norton's theorem	3	06-01-22			
5.	Maximum power transfer theorem	3	20-01-22			
6.	Active and Reactive powers in a Single-phase series R-L/R-C circuits	3	27-01-22			
7.	Resonant frequency, Bandwidth and Quality factor of RLC circuits	3	03-02-22			
8.	Self , Mutual Inductance and coefficient of coupling	3	17-02-22			
9.	Z-Parameters and Y-Parameters of two port network	3	24-02-22			
10.	DC shunt motor using break test	3	03-03-22			
11.	Efficiency of the single-phase transformer using OC and SC tests	3	10-03-22			
12.	Revision Lab	3	17-03-22			
13.	Internal Lab Examination	3	21-03-22			
No. of classes required to complete:10				**No. of classes taken:10**		

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**	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 EDUCATIONAL OBJECTIVES (PEOs):

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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
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PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
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PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Design and develop 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr.B.Siva Hari Prasad**	**Mr. T.Anil Raju**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

Part-A

PROGRAM : B. Tech. I-Sem.; ECE - B

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : Professional Communication - I (20FE01)

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : Mr. B. Sreenivasa Reddy

COURSE COORDINATOR: Dr. B. Samrajya Lakshmi

Pre-requisites : Basics in English Grammar & Vocabulary

Course Educational Objective (CEOs) : Improve the proficiency of students in English with an emphasis on Vocabulary& Grammar for better communication in formal and informal situations; Develop listening skills required for thorough understanding and analysis to face interviews with confidence.

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

CO1 : Use English vocabulary & grammar effectively while speaking and writing.
CO2 : Comprehend the given texts and Communicate confidently in formal and informal contexts.
CO3 : Draft E-mails& Memos
CO4 : Understand the written and spoken information thoroughly.
CO5 : Face interviews with confidence.

Course Articulation Matrix:

Course Code	COs	Programme Outcomes												PSOs		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
17FE01	CO1				2					3	3		2			
	CO2		1		2		1			3	3		2			
	CO3				2					3	3		2			
	CO4		1		2		1			3	3		2			
	CO5				2					3	3		2			
1 = Slight (Low) 2 = Moderate (Medium) 3-Substantial(High)																

BOS APPROVED TEXT BOOKS:

T1	Board of Editors, "Fluency in English – A Course book for Engineering Students", Orient Black Swan, Hyderabad, 2016.
T2	Dhanavel S.P, "English and Soft Skills", Orient Black Swan, Hyderabad, 2010.

BOS APPROVED REFERENCE BOOKS:

R1	Murphy, "English Grammar with CD", Cambridge University Press, New Delhi, 2004.
R2	Rizvi Ashraf M., "Effective Technical Communication", Tata Mc Graw Hill, New Delhi, 2008.
R3	Baradwaj Kumkum, "Professional Communication", I.K.International Publishing House Pvt.Lt., New Delhi, 2008.
R4	Raman, Meenakshi; Sharma, Sangeeta,. "Technical Communication -Principles and Practice" Oxford University Press, New Delhi, Third Edition. 2015.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A/B/C

UNIT-I :

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 UNIT-I	1	13.12.2021		TLM1			
2.	Proposal to Girdle The Earth by Nellie Bly	1	16.12.2021		TLM1	CO1	T1	
3.	Skimming for main idea ; Scanning for specific information	1	18.12.2021		TLM1, TLM2, TLM5	CO1	T1,R1,R3	
4.	Content words and Function words	1	20.12.2021		TLM1, TLM2, TLM5	CO1	T1,R1,R3	
5.	Word forms – verbs; Adjectives & adverbs	1	23.12.2021		TLM1, TLM2, TLM5	CO1	T1,R1,R3	
6.	Nouns – countable & uncountable, singular and plural nouns	1	27.12.2021		TLM1, TLM2, TLM5	CO1	T1,R1,R3	

7.	Word order in sentences, "Wh" questions	1	30.12.2021		TLM1	CO1	T1	
8.	Paragraph writing, Paragraph analysis Punctuation & Capital letters	1	03.01.2022		TLM1, TLM2 TLM5, TLM6	CO1	T1,R2,R4	
No. of classes required to complete UNIT-I : 08					No. of classes taken:			

UNIT-II :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
9.	The District School As It Way by One Who Went to it - Warren Burton	2	06.01.20220 08.01.2022		TLM1, TLM6	CO2	T2	
10.	Identifying sequence of ideas	1	10.01.2022		TLM1, TLM6	CO2	T2,R2,R4	
11.	Cohesive devices: linkers /signposts/transition signals	1	13.01.2022		TLM1, TLM2, TLM5, TLM6	CO2	T2,R2,R4	
12.	Cohesive devices: linkers /signposts/transition signals	1	17.01.2022		TLM1, TLM6	CO2	T2	
13.	Synonyms meanings of words / Phrases in the context	1	20.01.2022		TLM1, TLM6	CO2	T2,R2,R4	
14.	Synonyms meanings of words / Phrases in the context	1	22.01.2022		TLM1, TLM2, TLM5, TLM6	CO2	T2,R2,R4	

15.	Memo drafting	1	24.01.2022		TLM1, TLM2, TLM5, TLM6	CO2	T2,R2,R4	
16.	Memo drafting	1	27.01.2022		TLM1, TLM2, TLM5, TLM6	CO2	T2,R2,R4	
No. of classes required to complete UNIT-II : 9					No. of classes taken:			

UNIT-III :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	The Future of Work	2	29.01.2022 31.01.2022		TLM1	CO3	T1	
18.	Making basic inferences, Strategies to uses text clues for comprehension	2	03.02.2022 05.02.2022		TLM1, TLM2, TLM5, TLM6	CO3	T1,R2, R4	
MID EXAMS: 07.02.2022 to 12.02.2022								
19.	Verbs :tenses, reporting verbs for academic purpose	1	14.02.2022		TLM1, TLM2, TLM5, TLM6	CO3	T1,R1, R3	
20.	reporting verbs for academic purpose	1	17.02.2022		TLM1, TLM2, TLM5, TLM6	CO3	T1,R1, R3	
21.	Summarizing rephrasing what is read	1	19.02.2022		TLM1, TLM2, TLM5, TLM6	CO3	T1,R1, R3	
22.	Avoiding redundancies and repetitions	1	21.02.2022		TLM1, TLM2, TLM5, TLM6	CO3	T1,R1, R3	
No. of classes required to complete UNIT-III : 08					No. of classes taken:			

UNIT-IV :

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
23.	APJ Abdul Kalam	2	24.02.2022 26.02.2022		TLM1, TLM6	CO4	T2	
24.	Direct-Indirect speech	2	28.02.2022 03.03.2022		TLM1, TLM6	CO4	T2,R2,R4	
25.	Articles and their omission	2	05.03.2022 07.03.2022		TLM1, TLM6	CO4	T2,R2,R4	
26.	E-mail drafting	2	10.03.2022 12.03.2022		TLM1, TLM6	CO4	T2,R2,R4	
No. of classes required to complete UNIT-IV : 8					No. of classes taken:			

UNIT-V :

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
27.	C.V.Raman	2	14.03.2022 17.03.2022		TLM1, TLM6	CO5	T2	
28.	Subject – Verb agreement	2	19.03.2022 21.03.2022		TLM1, TLM6	CO5	T2,R2,R4	
29.	Prepositions	1	24.03.2022		TLM1, TLM6	CO5	T2,R2,R4	
30.	Formal Letter Writing	2	26.03.2022 28.03.2022		TLM1, TLM2, TLM5, TLM6	CO5	T2,R2,R4	
No. of classes required to complete UNIT-V : 07					No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
31.	Verbal Reasoning	1	31.03.2022		TLM1, TLM2, TLM5, TLM6	CO1 & CO5	Book of Reasoning by Agarwal	

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	**Units**	**Marks**
Assignment– 1	1	A1=5
Assignment– 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online Quiz-1	1,2	C1=10
Assignment– 3	3	A3=5
Assignment– 4	4	A4=5
Assignment– 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Online Quiz-2	3,4,5	C2=10
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=20
Evaluation of Online Quiz Marks: C=75% of Max(C1,C2)+25% of Min(C1,C	1,2,3,4,5	C=10
Attendance Marks based on Percentage of attendance		D=5
Cumulative Internal Examination : A+B+C+D	**1,2,3,4,5**	**40**
Semester End Examinations : E	**1,2,3,4,5**	**60**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

PART-D

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

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

Mr. B. Sreenivasa Reddy	**Prof. B. Samrajya Lakshmi**	**Prof. B.Samrajya Lakshmi**	**Prof. A. Ramireddy**
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

COURSE HANDOUT

Part-A

PROGRAM : I B. Tech., I-Sem., ECE - B
ACADEMIC YEAR : 2021-22
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.

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

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
CO5	3	2	-	2	-	-	-	-	-	-	-	1

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

BOS APPROVED TEXT BOOKS:

T1 Dr. B.S. Grewal, "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, New Delhi, 2012.

T2 Dr. B. V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

BOS APPROVED REFERENCE BOOKS:

R1 M. D. Greenberg, "*Advanced Engineering Mathematics*", 2nd Edition, TMH Publications, New Delhi, 2011.

R2 Erwin Kreyszig, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley & sons, New Delhi, 2011.

R3 W.E. Boyce and R. C. Diprima, " *Elementary Differential Equations*" , 7th Edition, John Wiley & sons, New Delhi,2011.

R4 S. S. Sastry, " *Introductory Methods of Numerical Analysis*" 5th 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	13/12/2021	18/01/2021	TLM1			

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
2.	Introduction to UNIT I	1	14/12/2021		TLM2	CO1	T1,T2	
3.	Formation of Differential Equations	1	14/12/2021		TLM1	CO1	T1,T2	
4.	Exact DE	1	15/12/2021		TLM1	CO1	T1,T2	
5.	Non-exact DE Type I	1	18/12/2021		TLM1	CO1	T1,T2	
6.	Non-exact DE Type II	1	20/12/2021		TLM1	CO1	T1,T2	
7.	Non-exact DE Type III	1	21/12/2021		TLM1	CO1	T1,T2	
8.	**TUTORIAL 1**	1	21/12/2021		TLM3	CO1	T1,T2	
9.	Non-exact DE Type IV	1	22/12/2021		TLM1	CO1	T1,T2	
10.	Orthogonal Trajectories (Cartesian)	1	27/12/2021		TLM1	CO1	T1,T2	
11.	Orthogonal Trajectories (polar)	1	28/12/2021		TLM1	CO1	T1,T2	
12.	Orthogonal Trajectories (polar)	1	28/12/2021		TLM1	CO1	T1,T2	
13.	Problems	1	29/12/2021		TLM1	CO1	T1,T2	
14.	**TUTORIAL 2**	1	03/01/2022		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-I		13			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
15.	Introduction to UNIT II	1	04/01/2022		TLM2	CO2	T1,T2	
16.	Solving a homogeneous DE	1	04/01/2022		TLM1	CO2	T1,T2	
17.	Finding Particular Integral, P.I for e^{ax+b}	1	05/01/2022		TLM1	CO2	T1,T2	
18.	P.I for Cos bx, or sin bx	1	08/01/2022		TLM1	CO2	T1,T2	
19.	P.I for polynomial function	1	10/01/2022		TLM1	CO2	T1,T2	
20.	P.I for $e^{ax+b}v(x)$	1	11/01/2022		TLM1	CO2	T1,T2	
21.	P.I for $e^{ax+b}v(x)$	1	11/01/2022		TLM1	CO2	T1,T2	
22.	P.I for $x^k v(x)$	1	12/01/2022		TLM1	CO2	T1,T2	
23.	Method of Variation of parameters	1	18/01/2022		TLM1	CO2	T1,T2	
24.	Method of Variation of	1	18/01/2022		TLM1	CO2	T1,T2	

	parameters							
25.	**TUTORIAL 3**	1	19/01/2022		TLM3	CO2	T1,T2	
26.	Method of Variation of parameters	1	22/01/2022		TLM1	CO2	T1,T2	
27.	**TUTORIAL 4**	1	24/01/2022		TLM3	CO2	T1,T2	
No. of classes required to complete UNIT-II		13			No. of classes 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
28.	Introduction to Unit-III	1	25/01/2022		TLM2	CO3	T1,T2	
29.	Solution by Taylor's series	1	25/01/2022		TLM1	CO3	T1,T2	
30.	Solution by Taylor's series	1	29/01/2022		TLM1	CO3	T1,T2	
31.	Solution by Taylor's series	1	31/01/2022		TLM1	CO3	T1,T2	
32.	Picard's Method	1	01/02/2022		TLM1	CO3	T1,T2	
33.	Picard's Method	1	01/02/2022		TLM1	CO3	T1,T2	
34.	**TUTORIAL 5**	1	02/02/2022		TLM1	CO3	T1,T2	
I MID EXAMINATIONS (07-02-2022 TO 12-02-2022)								
35.	Euler's Method	1	14/02/2022		TLM1	CO3	T1,T2	
36.	Modified Euler's Method	1	15/02/2022		TLM1	CO3	T1,T2	
37.	Modified Euler's Method	1	15/02/2022		TLM1	CO3	T1,T2	
38.	Runge Kutta Method	1	16/02/2022		TLM1	CO3	T1,T2	
39.	Runge Kutta Method	1	19/02/2022		TLM1	CO3	T1,T2	
40.	**TUTORIAL 6**	1	21/02/2022		TLM3	CO3	T1,T2	
No. of classes required to complete UNIT-III		13			No. of classes 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
41.	Introduction to UNIT IV	1	22/02/2022		TLM1	CO4	T1,T2	
42.	Generalized Mean Value Theorem, Taylor's series	1	22/02/2022		TLM1	CO4	T1,T2	
43.	Maclaurin's series	2	23/02/2022 26/02/2022		TLM1	CO4	T1,T2	
44.	Functions of several variables	2	28/02/2022 01/03/2022		TLM1	CO4	T1,T2	
45.	Jacobians (polar, cylindrical, spherical coordinates)	2	02/03/2022 05/03/2022		TLM1	CO4	T1,T2	
46.	Functional dependence	1	07/03/2022		TLM1	CO4	T1,T2	
47.	**TUTORIAL 7**	1	08/03/2022		TLM3	CO4	T1,T2	
48.	Maxima and Minima of functions of two variables	1	08/03/2022		TLM1	CO4	T1,T2	
49.	Maxima and Minima of functions of two variables	2	09/03/2022 12/03/2022		TLM1	CO4	T1,T2	
50.	**TUTORIAL 8**	1	14/03/2022		TLM3	CO4	T1,T2	

No. of classes required to complete UNIT-IV	14	No. of classes 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
51.	Introduction to UNIT V	1	15/03/2022		TLM1	CO5	T1,T2	
52.	Formation of PDE by elimination of arbitrary constants	2	15/03/2022 16/03/2022		TLM1	CO5	T1,T2	
53.	Formation of PDE by elimination of arbitrary functions	2	19/03/2022 21/03/2022		TLM1	CO5	T1,T2	
54.	**TUTORIAL 9**	1	22/03/2022		TLM3	CO5	T1,T2	
55.	Solving of PDE	1	22/03/2022		TLM1	CO5	T1,T2	
56.	Lagrange's Method	1	23/03/2022		TLM1	CO5	T1,T2	
57.	Lagrange's Method	1	26/03/2022		TLM1	CO5	T1,T2	
58.	**TUTORIAL 10**	1	28/03/2022		TLM3	CO5	T1,T2	
59.	Revision	1	29/03/2022		TLM1	CO5	T1,T2	
60.	Revision	1	29/04/2022		TLM1	CO5	T1,T2	
No. of classes required to complete UNIT-V		10			No. of classes taken:			

Contents beyond the Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
61.	Solving of PDE other methods	1	30/03/2022		TLM5	CO5	T1,T2	
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (04-04-2022 TO 09-04-2022)								

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

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

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

Name of Course Instructor : Mrs.N.Aruna
Course Name & Code : Applied Physics, 20FE07
L-T-P Structure : 2-1-0 Credits : 4
Program/Sem/Sec : B.Tech., ECE, I-Sem., Section- B A.Y : 2021-22

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	PO7	PO8	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., 2nd Edition, 2014.

BOS APPROVED REFERENCE BOOKS:

R1 : M.N. Avadhanulu, TVS Arun Murthy, "Applied *Physics*", S. Chand & Co., 2nd

Edition, 2007.

R2 P.K. Palani Samy, "*Applied Physics*", Sci. Publ. Chennai, 4th Edition, 2016.

R3 P. Sreenivasa Rao, K Muralidhar, "*Applied Physics*", Him. Publi. Mumbai,1st Edition, 2016.

R4 Hitendra K Mallik , AK Singh " *Engineering Physics*", TMH, New Delhi, 1st Edition, 2009.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Interference and Diffraction

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Course and COs Introduction to Unit-I	1	13-12-2021		TLM2	
2.	Superposition of waves, Coherence, Conditions for Interference	1	14-12-2021		TLM1	
3.	Interference from thin films	1	16-12-2021		TLM1,2	
4.	Newton's rings	1	17-12-2021		TLM1,2	
5.	Michelson's interferometer	1	20-12-2021		TLM3	
6.	Diffraction-Introduction	1	21-12-2021		TLM1,2	
7.	Single slit diffraction	1	23-12-2021		TLM2	
8.	Single slit diffraction	1	24-12-2021		TLM2	
9.	Circular aperture	1	27-12-2021		TLM1,2	
10.	Diffraction –N parallel slits and grating-Characteristics	1	28-12-2021		TLM3	
11.	Resolving power of Grating	1	30-12-2021		TLM1.2	
12.	Problems/ Assignment	1	31-12-2021		TLM1	
No. of classes required to complete UNIT-I: 12				No. of classes taken:		

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	1	03-01-2022			
2.	Characteristics of Lasers,					
3.	Principle of laser, Population inversion, Meta stable state,	1	04-01-2022		TLM1	
4.	Einstein's coefficients	1	06-01-2022			
5.	Laser Components ,Nd-YAG Laser	1	07-01-2022		TLM3	
6.	He-Ne gas laser,	1	10-01-2022		TLM2	
7.	Principle and Structure of optical fibre	1	11-01-2022		TLM2	
8.	Acceptance angle	1	17-01-2022		TLM1	

	&Numerical Aperture					
9.	Step index and Graded index fibers	1	18-01-2022		TLM2	
10.	Applications	1	20-01-2022		TLM1,2	
11	Problems/ Assignment	1	21-01-2022		TLM2	
No. of classes required to complete UNIT-II: 11				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, Properties of matter waves	1	24-01-2022		TLM1	
2.	Davisson and Germer Experiment		25-01-2022		TLM2	
3.	Schrodinger wave equation-Time independent,dependent	1	27-01-2022		TLM2	
4.	Physical significance of wave function, Particle in a box	1	28-01-2022		TLM1	
5.	Classical free electron theory- postulates	1	07-02-2022		TLM1	
6.	drift velocity, Expression for electrical conductivity	1	08-02-2022		TLM1	
7.	Advantageous and drawbacks	1	10-02-2022		TLM1	
8.	Fermi –Dirac statistics	1	11-02-2022		TLM1	
9.	Classification of solids -band theory	1	14-02-2022		TLM2	
10.	Problems/ Assignment	1	15-02-2022		TLM2	
No. of classes required to complete UNIT-III: 10				drift velocity, Resistivity:		

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 Weekly
1.	Introduction to UNIT-IV Carrier concentration - Intrinsic semiconductor	1	17-02-2022		TLM1	
2.	Carrier concentration - Intrinsic semiconductor	1	18-02-2022		TLM1	
3.	Carrier concentration - Extrinsic semiconductor	1	21-02-2022		TLM1	
4.	Carrier concentration - Extrinsic semiconductor	1	22-02-2022		TLM1	
5.	Energy band gap of a	1	24-02-2022		TLM1.2	

	Semiconductor					
6.	Drift and diffusion current	1	25-02-2022		TLM3	
7.	Einstein relations	1	25-02-2022		TLM1,2	
8.	Hall effect	1	28-02-2022		TLM1,2	
9.	Direct band gap and indirect band gap semiconductors	1	03-03-2022		TLM1,2	
10.	Solar cell, Applications	1	04-03-2022		TLM5	
11.	Problems/ Assignment	1	07-03-2022		TLM5	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V :Magnetic and Dielectric materials

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-V Magnetic parameters	1	08-03-2022		TLM1	
2.	Classification of magnetic materials	1	10-03-2022		**TLM3**	
3.	Hysteresis loop	1	11-03-2022		**TLM2**	
4.	Soft &Hard magnetic materials	1	14-03-2022			
5.	Types of polarization-Electronic polarization	1	15-03-2022		**TLM1,2**	
6.	Ionic and Orientation Polarization	1	18-03-2022		**TLM2**	
7.	Local field	1	21-03-2022		**TLM1**	
8.	Classius mosotti equation Applications	1	22-03-2022		**TLM1**	
9.	Problems/Assignment	1	24-03-2022		**TLM3**	
10.	Revision	1	26-03-2022		**TLM3**	
No. of classes required to complete UNIT-V: 10				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

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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	**Dr. S.Yusub**	**Dr. S.Yusub**	**Dr. A. Rami Reddy**

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: Mr. T. Anil Raju
Course Name & Code : BASIC ELECTRICAL ENGINEERING-20EE01 **Regulation**: R20
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech. I-Sem., ECE B Sec **A.Y.:** 2020-21

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.

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	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** –Medium							**3** - 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, 3rd edition 2017.

R2 A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7th Edition, New Delhi 2017.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): ECE B 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	13-12-21		T1,R1	
2.	Active and Passive Elements	1	16-12-21		T1,R1	
3.	Independent and Dependent Sources	1	17-12-21		T1,R1	
4.	Ohm's Law and Kirchhoff's Laws	1	18-12-21		T1,R1	
5.	Series and Parallel Connection	1	20-12-21		T1,R1	
6.	Star to Delta & Delta to Star Transformations	1	23-12-21		T1,R1	
7.	Source Transformations	1	24-12-21		T1,R1	
8.	Mesh Analysis and Problems	1	27-12-21		T1,R1	
9.	Supermesh Analysis	1	30-12-21		T1,R1	
10.	Node analysis and Problems	1	31-12-21		T1,R1	
11.	Supernode Analysis	1	03-01-22		T1,R1	
12.	Duality and Dual networks.	1	06-01-22		T1,R1	
13.	Assignment-1	1	07-01-22		T1,R1	
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 ,Mutual inductance & Coefficient of Coupling, Dot Convention	1	08-01-22		T1,R1	
15.	Series and Parallel Inductance Circuits, Coupled circuits	1	06-01-22		T1,R1	
16.	R.M.S, Average Instantaneous Values, Phase and Phase Difference	1	10-01-22		T1,R1	
17.	Behavior of R, L and C Circuits.	1	17-01-22		T1,R1	
18.	Behavior of RL Series Circuit	1	20-01-22		T1,R1	
19.	Behavior of RC Series Circuit	1	21-01-22		T1,R1	
20.	Behavior of Series RLC Circuit	1	22-01-22		T1,R2	
21.	Behavior of Parallel RLC Circuit	1	24-01-22			
22.	Reactance and Susceptance	1	27-01-22		T1,R1	
23.	Impedance and Admittance	1	28-01-22		T1,R1	
24.	Real Power, Reactive Power, Apparent Power and Power Factor	1	29-01-22		T1,R1	
25.	Assignment-2	1	31-01-22		T1,R2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken: 12**		

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
26.	Superposition Theorem	1	02-02-22		T1,R1	
27.	Thevenin's Theorem & Norton's Theorem	1	03-02-22		T1,R1	

28.	Maximum Power Transfer Theorem	1	04-02-22		T1,R1	
29.	Reciprocity Theorem & Millman's Theorem	1	05-02-22		T1,R1	
30.	Series Resonant Circuit	1	14-02-22		T1,R1	
31.	Parallel Resonant Circuit	1	17-02-22		T1,R1	
32.	Band Width & Quality Factor	1	18-02-22		T1,R1	
33.	Assignment-3	1	19-02-22		T1,R1	
No. of classes required to complete UNIT-III: 08				**No. of classes taken:08**		

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
34.	Driving point and transfer functions	1	21-02-22		T1,R1	
35.	Poles and zeros of network functions	1	24-02-22		T1,R1	
36.	Restrictions of pole and zero locations	1	25-02-22		T1,R1	
37.	Driving point and transfer functions	1	26-02-22		T1,R1	
38.	Z, Y Parameters	1	28-02-22		T1,R1	
39.	ABCD & h-parameters	1	03-03-22		T1,R1	
40.	Inter-relationship between parameters	1	04-03-22		T1,R1	
41.	Series, Parallel and Cascade Connections	1	05-03-22		T1,R1	
42.	Assignment-4	1	07-03-22		T1,R1	
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
43.	Introduction to machines	1	10-03-22		T1,R1	
44.	Generator principle, Types of Generators	1	11-03-22		T1,R1	
45.	E.M.F Equation of a Generator	1	14-03-22		T1,R1	
46.	Motor principle, Significance of back e.m.f	1	17-03-22		T1,R1	
47.	Voltage equation of a motor	1	19-03-22		T1,R1	
48.	Brake Test on the DC shunt motor	1	21-03-22		T1,R1	
49.	Working principle of Transformer	1	24-03-22		T1,R1	
50.	Ideal Transformer and E.M.F Equation of a Transformer	1	25-03-22		T1,R1	
51.	Transformer Tests (OC and SC)	1	26-03-22		T1,R1	
52.	Electrical Safety: Definitions and precautions	1	28-03-22		T1,R1	
53.	Concepts of grounding and earthing		31-03-22		T1,R1	
54.	Assignment-V	1	01-04-22		T1,R1	
No. of classes required to complete UNIT-V: 12				**No. of classes taken:12**		

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

PART-D

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

	knowledge of, and need for sustainable development
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
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PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr .T.Anil Raju**	**Mr .T.Anil Raju**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
Signature				

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi, Accredited by NAAC & 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 B Sec

ACADEMIC YEAR : 2021-22

COURSE NAME : Electronic Devices and Circuits-20EC01

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

COURSE CREDITS : **3**

COURSE INSTRUCTOR : Mr. G. Venkata Rao, Assoc. Professor

COURSE COORDINATOR : Mr. G. Venkata Rao, Assoc. Professor

Pre-requisites: 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 (CO)

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 Characteristics and mathematical models.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	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	-

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

BOS APPROVED TEXT BOOKS:

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

BOS APPROVED REFERENCE BOOKS:

1 Boylestad R.L. and Louis Nashelsky, Electronic Devices and Circuits, Fourth edition, Pearson/Prentice Hall Publishers, 2014

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

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): ECE B Sec.

UNIT-I: Semiconductor Device Characteristics

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 course, Course Outcomes, Introduction to subject	1	13/12/21				T1,R1	
2.	Semiconductor physics overview	1	14/12/21				T1,R1	
3.	Semiconductor physics overview	1	15/12/21				T1,R1	
4.	Introduction to UNIT-I: Qualitative theory of the p-n Junction	1	17/12/21				T1,R1	
5.	The Current components in a p-n Diode	1	18/12/21				T1,R1	
6.	The Volt- Ampere Characteristic	1	20/12/21				T1,R1	
7.	Effect of temperature on V- I Characteristic	1	21/12/21					
8.	Diode Capacitance-Transition	1	22/12/21				T1,R1	
9.	Diffusion Capacitance		24/12/21					
10.	Tutorial-I	1	27/12/21					
11.	Tutorial-II	1	28/12/21					
12.	Operation and characteristics of Zener Diode	1	29/12/21				T1,R1	
13.	Tunnel Diode	1	31/12/21				T1,R1	
14.	Solar cell	1	03/01/22					
15.	UJT & SCR	1	04/01/22				T1,R2	
16.	Assignment-I	1	05/01/22				T1,R1	
No. of classes required to complete UNIT-I		**16**			**No. of classes 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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Introduction to Power supplies	1	07/01/22				T1,R1	
18.	Half wave Rectifiers	1	08/01/22				T1,R1	
19.	HWR With Capacitive & Inductive filters	1	10/01/22				T1,R1	
20.	Full wave Rectifier-Centre tapped	1	11/01/22				T1,R1	
21.	Full wave Rectifier-Bridge	1	12/01/22				T1,R1	
22.	Ripple removal using Capacitive	1	17/01/22				T1,R1	
23.	Inductive filter	1	18/01/22				T1,R1	
24.	L section filter	1	19/01/22				T1,R1	

25.	π section filters	1	21/01/22				T1,R1	
26.	Tutorial-III	1	22/01/22				T1,R1	
27.	Voltage Regulator using Zener diode	1	24/01/22				T1,R2	
28.	Clippers	1	25/01/22				T1,R1	
29.	Clampers	1	28/01/22				T1,R1	
30.	Tutorial-IV	1	29/01/22				T1,R1	
31.	Assignment-II	1	31/01/22				T1,R1	
No. of classes required to complete UNIT-II		**15**			**No. of classes 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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
32.	BJT-construction	1	01/02/22				T1,R1	
33.	Different regions of operations	1	02/02/22				T1,R1	
34.	Transistor Current components: Emitter Efficiency, Transport Factor, Large Signal Current Gain	1	04/02/22				T1,R1	
35.	Input and Output characteristics of CB Configuration	1	05/02/22				T1,R1	
36.	Input and Output characteristics of CE Configuration	1	14/02/22				T1,R1	
37.	Input and Output characteristics of CC Configuration	1	15/02/22				T1,R1	
38.	Representation and Relation b/w α , β & γ	1	16/02/22				T1,R1	
39.	Tutorial-V	1	18/02/22				T1,R1	
40.	Tutorial-VI	1	19/02/22				T1,R1	
41.	Ebers-Moll Model.	1	21/02/22				T1,R1	
42.	**Assignment-III**	1	22/02/22				T1,R1	
No. of classes required to complete UNIT-III		**11**			**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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
43.	FET Classification & Construction	1	23/02/22		TLM1		T1,R1	
44.	Comparison between FET and BJT	1	25/02/22				T1,R1	
45.	Drain Characteristics of n-channel JFET	1	26/02/22				T1,R1	
46.	Transfer Characteristics of n-channel JFET	1	28/02/22				T1,R1	

47.	n-channel enhancement MOSFET	1	01/03/22				T1,R1	
48.	Drain Characteristics of n-channel MOSFET	1	02/03/22				T1,R1	
49.	Transfer Characteristics of n-channel MOSFET	1	04/03/22				T1,R1	
50.	Drain Characteristics of p-channel MOSFET	1	05/03/22				T1,R1	
51.	Transfer Characteristics of p-channel MOSFET	1	07/03/22				T1,R1	
52.	Tutorial-VII	1	08/03/22				T1,R1	
53.	Tutorial-VIII	1	09/03/22				T1,R1	
54.	MOS Capacitor	1	11/03/22				T1,R1	
55.	MOS Capacitor	1	12/03/22				T1,R1	
56.	**Assignment-IV**	1	14/03/22				T1,R1	
No. of classes required to complete UNIT-IV		**14**			**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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
57.	Need for biasing; Operating Point	1	15/03/22				T1,R1	
58.	Stabilization of Operating Point: S, S' & S"	1	16/03/22				T1,R1	
59.	Biasing circuits- Fixed bias with and without Emitter resistance	1	18/03/22				T1,R1	
60.	Collector to Base Bias with and without Emitter resistance	1	19/03/22				T1,R1	
61.	Self Bias	1	21/03/22				T1,R1	
62.	Thermal Runaway and Thermal Stability	1	22/03/22				T1,R1	
63.	Bias Compensation techniques.	1	23/03/22				T1,R1	
64.	Tutorial-VI	1	25/03/22				T1,R1	
65.	FET Voltage divider bias	1	26/03/22				T1,R1	
66.	Small signal equivalent of FET	1	28/03/22				T1,R1	
67.	Tutorial-IX	1	29/03/22				T1,R1	
68.	Assignment-X	1	30/03/22				T1,R1	
No. of classes required to complete UNIT-V		**12**			**No. of classes taken:**			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
69.	Diode applications in digital electronics	1	01/04/22 & 02/04/22				T1,R1	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

Part – C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment – 1	1,2,3,4	A1=5
Assignment – 2	1,2,3,4	A2=5
Quiz – 1	1,2,3,4	B1=14
I-Mid Examination	1,2,3,4	C1=36
Assignment – 3	1,2,3,4	A3=5
Assignment – 4	1,2,3,4	A4=5
Assignment – 5	1,2,3,4	A5=5
Quiz – 2	1,2,3,4	B2=14
II-Mid Examination	1,2,3,4	C2=36
Evaluation of Assignment Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4	A=5
Evaluation of Quiz Marks: B= 75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4	B=7
Evaluation of Mid Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4	C=18
Cumulative Internal Examination : A+B+C	**1,2,3,4**	**A+B+C=30**
Semester End Examinations	**1,2,3,4**	**D=70**
Total Marks: A+B+C+D	**1,2,3,4**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1: To Attain a solid foundation in Electronics & Communication Engineering fundamentals with an attitude to pursue continuing education.

PEO2: To Function professionally in the rapidly changing world with advances in technology

PEO3: To Contribute to the needs of the society in solving technical problems using Electronics & Communication Engineering principles, tools and practices.

PEO4: To Exercise leadership qualities, at levels appropriate to their experience, which addresses issues in a responsive, ethical, and innovative manner?

PROGRAMME OUTCOMES (POs):

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

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

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

PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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

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

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

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

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

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

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.

PSO2: Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools

PSO3: Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

Mr. G. Venkata Rao	Mr. G. Venkata Rao	Dr.G.Srinivasulu	Dr.Y.Amar Babu
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD ECE**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRONICS & 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- B

ACADEMIC YEAR : 2021-2022

COURSE NAME & CODE : PROFESSIONAL COMMUNICATION SKILLS LAB - 20FE51

L-T-P STRUCTURE : 0-0-2

COURSE CREDITS : 1

COURSE INSTRUCTOR : Mr. B. Sreenivasa Reddy / Dr.V. Pawel

COURSE COORDINATOR : Dr.B.Samrajya Lakshmi

Pre-Requisites : Students should have fundamental knowledge in making sentences and be with readiness to speak

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

CO1 : Articulate English with good pronunciation.
CO2 : Manage skillfully through group discussions.
CO3 : Communicate with the people effectively.
CO4 : Collect and interpret data aptly.

Course Articulation Matrix:

Course Code	COs	Programme Outcomes												PSOs		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
17FE60	CO1				3					3	3		2			
	CO2				3					3	3		2			
	CO3				3					3	3		2			
	CO4				3					3	3		2			
	CO5				3					3	3		2			
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 Lab Manual:

- Board of Editors, "ELCS Lab Manual – A Workbook of CALL and ICS Lab Activities", Orient Black Swan Pvt. Ltd., Hyderabad, 2016.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S.No.	Activity	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Introduction	2	14.12.2021		TLM4		
2.	Self Introduction	2	21.12.2021		TLM4	CO3	
3.	JAM- I	2	28.12.2021		TLM4	CO3	
4.	JAM-II	2	04.01.2022		TLM4	CO3	
5.	Role Play-I	2	11.01.2022		TLM4	CO3	
6.	Role Play-II	2	18.01.2022		TLM4	CO3	
7.	Role Play-III	2	25.01.2022		TLM4	CO3	
8.	Data Interpretation-I	2	01.02.2022		TLM4	CO3	
I MID EXAMS : **07-02-2022 to 12-02-2022**							
9.	Data Interpretation-II	2	15.02.2022		TLM2, TLM4	CO4	
10.	Data Interpretation-III	2	22.02.2022		TLM2, TLM4	CO4	
11.	Group Discussion-I	2	08.03.2022		TLM2, TLM4	CO4	
12.	Group Discussion-II	2	15.03.2022		TLM4, TLM6	CO2	
13.	Group Discussion-III	2	22.03.2022		TLM4, TLM6	CO2	
14.	Internal Lab Exam	2	29.03.2022		TLM4, TLM6	CO2	
Total Lab Sessions:		**28**					

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:

According to Academic Regulations of R20 Distribution and Weightage of Marks For Laboratory Courses is as follows.

(a) Continuous Internal Evaluation (CIE):

- ✓ The continuous internal evaluation for laboratory courses (including Computer aided engineering drawing, computer aided engineering graphics, Computer aided machine drawing etc.) is based on the following parameters:

Parameter		**Marks**
Day – to – Day Work	Observation	10 Marks
	Record	10 Marks
Internal Test		10 Marks
Attendance		05 Marks
Viva – Voce During Regular Lab Sessions		05 Marks
Total		**40 Marks**

% of Attendance	**Marks**
≥ 95	05 Marks
90 to < 95	04 Marks
85 to < 90	03 Marks
80 to < 85	02 Marks
75 to < 80	01 Mark

(b) Semester End Examinations (SEE):

- ✓ The performance of the student in laboratory courses shall be evaluated jointly by internal and external examiners for 3 hours duration as per the parameters indicated below:

Parameter	Marks
Phonemes	05 Marks
Short answers on phonetics	05 Marks
Transcription	10 Marks
Dialogue writing	10 Marks
Presentation	10 Marks
Interview	20 Marks
Total	**60 Marks**

Rubrics For Evaluation of Laboratory Courses

Day-To-Day Lab (Observation) Performance Evaluation (R-20)					Record Performance Evaluation (R-20)			
S.N	**Criteria**	**Poor**	**Average**	**Good**	**Criteria**	**Poor**	**Average**	**Good**
1.	Language suitability **(4 Marks)**	Wrong usage of words Grammatical errors **(2 Marks)**	Some points are missing from the data written Wrong usage of grammar & vocabulary. **(3 Marks)**	Well-written & spoken Language is error free **(4 Marks)**	Language **(4 Marks)**	Language used is not suitable Full of incorrect vocabulary **(2 Marks)**	Some words are inappropriately used / wrongly spelt **(3Marks)**	Language used is good No word/ spelling errors **(4 Marks)**
2.	Content **(4Marks)**	Unable to Deliver all the pints Delivering Irrelevant point **(2 Marks)**	Some points are not given Point analysis is not upto the mark **(3 Marks)**	All the points are analysed properly More content was delivered. **(4 Marks)**	Content **(4 Marks)**	Very less points were written Points were not analysed properly **(2 Marks)**	Some of the points were missing Some points are not properly analysed **(3 Marks)**	Complete information is provided for the topic Important information is provided with illustrations/ exaamples **(4 Marks)**
3.	Style of Presentation **(2 Marks)**	Inappropriate body language Improper prentation **(0 Marks)**	Prentation is not upto the mark **(1 Mark)**	Presented well with appropriate ettiquett All important conclusions have been clearly made, student shows good understanding of the topic. **(2 Marks)**	Grammar & Neatness **(2 Mark)**	Frequent grammar and/r spelling errors writing style is rough and immature **(1/2 Mark)**	Some grammatical errors **(1 Marks)**	No grammar/ spelling corrections are found and well-written **(2 Marks)**

PROGRAMME OUTCOMES (POs):

Engineering Graduates will be able to:

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

Mr. B. Sreenivasa Reddy	Prof.B.Samrajya Lakshmi	Prof.B.Samrajya Lakshmi	Prof.A.Rami Reddy
Course Instructor	Course Coordinator	Module Coordinator	HOD

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

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., I-Sem.,ECE -B

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : APPLIED PHYSICS LAB -20 FE54

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

COURSE CREDITS : 1.5

COURSE INSTRUCTOR : **Mrs.N.Aruna**

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 :

Co1.	Analyze the wave characteristics of Light.
Co2.	Estimate the magnetic field using Stewart's and Gee's apparatus
Co3.	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	**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**		
CATEGORY	**BASIC SCIENCES**											
APPROVAL	**APPROVED BY ACADEMIC COUNCIL, 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 Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	CEO'S &CO'S Introduction	3	16-12-2021		**TLM4**	1,2,3,4	T1	
2.	Demonstration	3	23-12-2021		**TLM4**	CO1, CO2, CO3, CO4	T1	
3.	Experiment 1	3	30-12-2021		**TLM4**	CO1, CO2, CO3, CO4	T1	
4.	Experiment 2	3	06-01-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
5.	Experiment 3	3	20-01-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
6.	Experiment 4	3	27-01-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
7.	Experiment 5	3	03-02-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
8.	Demonstration	3	10-02-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
9.	Experiment 6	3	17-02-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
10.	Experiment 7	3	24-02-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
11.	Experiment 8	3	10-03-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
12.	Experiment 9	3	17-03-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
13.	**Internal Exam**	3	24-03-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
No. of classes required to complete lab		39			No. of classes taken: 39			

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

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

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

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

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

PROGRAM SPECIFIC OUTCOMES (PSOs):

Graduate of the ECE will have the ability to

(1) Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.

(2) Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools

(3) Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

N.Aruna/P V Sirisha	Dr S.Yusub	Dr S.Yusub	Dr A. Ramireddy
Course Instructor	Course Coordinator	Module Coordinator	HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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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: Mr.T Anil Raju/Mr. N. Dharamchari
Course Name & Code : Basic Electrical Engineering Lab- 20EE51 **Regulation**:R20
L-T-P Structure : 0-0-3 **Credits:**1.5
Program/Sem/Sec : B.Tech., ECE., I-Sem., Section-B BATCH-1 **A.Y.:** 2021-22

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	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
CO4									2	3			0	0	0
1 - Low						**2** –Medium						**3** - 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, 3rd edition 2017.

R2 A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7th Edition, New Delhi 2017.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):B Section-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.	Kirchhoff's laws	3	15-12-21			
2.	Voltage & Current division rules	3	22-12-21			
3.	Superposition theorem	3	29-12-21			
4.	Thevenin's & Norton's theorem	3	05-01-22			
5.	Maximum power transfer theorem	3	19-01-22			
6.	Active and Reactive powers in a Single-phase series R-L/R-C circuits	3	02-02-22			
7.	Resonant frequency, Bandwidth and Quality factor of RLC circuits	3	16-02-22			
8.	Z-Parameters and Y-Parameters of two port network	3	23-02-22			
9.	DC shunt motor using break test	3	02-03-22			
10.	Efficiency of the single-phase transformer using OC and SC tests	3	09-03-22			
11.	Revision Lab	3	16-03-22			
12.	Internal Lab Examination		23-03-22			
No. of classes required to complete:10				**No. of classes taken:10**		

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. T.Anil Raju**	**Dr.B.Siva Hari Prasad**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
Signature				

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.T Anil Raju/Mr. N. Dharamchari
Course Name & Code : Basic Electrical Engineering Lab- 20EE51 **Regulation**:R20
L-T-P Structure : 0-0-3 **Credits:**1.5
Program/Sem/Sec : B.Tech., ECE., I-Sem., Section-B BATCH-2 **A.Y.:** 2021-22

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	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
CO4									2	3			0	0	0
1 - Low						**2** –Medium						**3** - 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, 3rd edition 2017.

R2 A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7th Edition, New Delhi 2017.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):B Section-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.	Lab Introduction	3	17-12-21			
2.	Kirchhoff's laws	3	24-12-21			
3.	Voltage & Current division rules	3	31-12-21			
4.	Superposition theorem	3	07-01-22			
5.	Thevenin's & Norton's theorem	3	21-01-22			
6.	Maximum power transfer theorem	3	28-01-22			
7.	Active and Reactive powers in a Single-phase series R-L/R-C circuits	3	04-02-22			
8.	Resonant frequency, Bandwidth and Quality factor of RLC circuits	3	18-02-22			
9.	Z-Parameters and Y-Parameters of two port network	3	25-02-22			
10.	DC shunt motor using break test	3	04-03-22			
11.	Efficiency of the single-phase transformer using OC and SC tests	3	11-03-22			
12.	Revision Lab	3	18-03-22			
13.	Internal Lab Examination		01-04-22			
No. of classes required to complete:10				**No. of classes taken:10**		

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. T.Anil Raju**	**Dr.B.Siva Hari Prasad**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
Signature				

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DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. G. Venkata Rao, Associate Professor

Course Name & Code : EDC Lab-20EC51 **Regulation**:R20
L-T-P Structure : 0-0-3 **Credits:** 1.5
Program/Sem/Sec : B. Tech. I-Sem., ECE B Sec **A.Y.:** 2021-22

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
CO2	Analyze the device parameters of Diodes, Bipolar Junction Transistors, and Field Effect 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	**1**	-
CO2	3	1	-	-	-	-	-	-	-	-	1	1	-	**2**	-
CO3	3	1	1	-	-	-	-	-	-	-	-	-	-	**2**	-
CO4	-	-	-	-	-	-	-	-	3	2	-	-	-	-	-
1 - Low **2 –**Medium **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): 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.	Identification of components: Active and Passive Devices, Study and operation of Regulated Power Supplies, CRO and Function generators.	3	15/12/21 & 22/12/21		TLM1 & TLM4	
2.	Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode using Characteristics	3	29/12/21		TLM1 & TLM4	
3.	Determination of Breakdown voltage of Zener diode and Design of Zener Voltage regulator	3	05/01/22		TLM1 & TLM4	
4.	Realization and performance evaluation of Half wave rectifier with and without Capacitor filter	3	19/01/22		TLM1 & TLM4	
5.	Realization and performance evaluation of Full wave rectifier with and without Capacitor filter	3	02/02/22		TLM1 & TLM4	
6.	Analysis of Transistor CB Configuration for its Input and Output resistances and Current gains using V-I Characteristics	3	16/02/22		TLM1 & TLM4	
7.	Analysis of Transistor CE Configuration for its Input and Output resistances and Current gains using V-I Characteristics	3	23/02/22		TLM1 & TLM4	
8.	Analysis of Drain and Transfer Characteristics of FET for its Drain Resistance, Transconductance and Amplification factor	3	02/03/22		TLM1 & TLM4	
9.	Design and Realization of diode Series Voltage Clippers with and without bias voltage	3	09/03/22		TLM1 & TLM4	
10.	Design and Realization of Voltage Clamper circuits using Diode and capacitors	3	16/03/22		TLM1 & TLM4	
11.	Revision/ Additional experiment	3	23/03/22		TLM4	
12.	Internal lab exam	3	30/03/22			
No. of classes required to complete : 24				**No. of classes 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.	Identification of components: Active and Passive Devices, Study and operation of Regulated Power Supplies, CRO and Function generators.	3	17/12/21		TLM1 & TLM4	
2.	Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode using Characteristics	3	24/12/21		TLM1 & TLM4	
3.	Determination of Breakdown voltage of Zener diode and Design of Zener Voltage regulator	3	31/12/21		TLM1 & TLM4	
4.	Realization and performance evaluation of Half wave rectifier with and without Capacitor filter	3	07/01/22		TLM1 & TLM4	
5.	Realization and performance evaluation of Full wave rectifier with and without Capacitor filter	3	21/01/22		TLM1 & TLM4	
6.	Analysis of Transistor CB Configuration for its Input and Output resistances and Current gains using V-I Characteristics	3	28/01/22		TLM1 & TLM4	
7.	Analysis of Transistor CE Configuration for its Input and Output resistances and Current gains using V-I Characteristics	3	04/02/22		TLM1 & TLM4	
8.	Analysis of Drain and Transfer Characteristics of FET for its Drain Resistance Transconductance and Amplification factor	3	18/02/22		TLM1 & TLM4	
9.	Design and Realization of diode Series Voltage Clippers with and without bias voltage	3	25/02/22		TLM1 & TLM4	
10.	Design and Realization of Voltage Clampers circuits using Diode and capacitors	3	04/03/22		TLM1 & TLM4	
11.	Revision/ Additional experiment	3	11/03/22		TLM4	
12.	Internal lab exam	3	25/03/22			
No. of classes required to complete : 24				**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**	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 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 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
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PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
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PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry
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PSO 3	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 Departme**
Mr. G. Venkata Rao	**Mr. G. Venkata Rao**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**

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DEPARTMENT OF ARTIFICIAL INTELLEGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor : **Ms. M. ANURADHA**
Course Name & Code : PC-I, 20FE01
L-T-P Structure : **2-0-0** **Credits:** 02
Program/Sem/Sec :ECE - C – I SEM
A.Y. : 2021-22

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.

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		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			
1 - Low						**2** –Medium						**3** - High			

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	15-12-2021		TLM2	
2.	Proposal to Girdle The Earth by Nellie Bly	02	16-12-2021 17-12-2021		TLM2	
3.	Reading: Skimming for main idea ; Scanning for specific information	01	22-12-2021		TLM2	
4.	Content words and Function words	01	23-12-2021		TLM2	
5.	Word forms – verbs; Adjectives & adverbs	01	24-12-2021		TLM2	
6.	Nouns – countable & uncountable, singular and plural nouns Word order in sentences, "Wh" questions	01	30-12-2021		TLM2	
7.	Writing: Paragraph writing, Paragraph analysis	02	31-12-2022 05-01-2022		TLM2 TLM6	
No. of classes required to complete UNIT-I: 09				**No. of classes taken:**		

UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
8.	The District School As It Way by One Who Went to it - Warren Burton	02	06-01-2022 07-01-2022		TLM2	
9.	Identifying sequence of ideas	01	12-01-2022		TLM2	
10.	Cohesive devices: linkers signposts/transition signals	01	19-01-2022		TLM2	
11.	Synonyms meanings of words / Phrases in the context	01	20-01-2022		TLM2	
12.	Essay Writing - Memo drafting	02	21-01-2022 27-01-2022		TLM2 TLM6	
No. of classes required to complete UNIT-II: 07				**No. of classes taken:**		

UNIT-III:

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.	The Future of Work	02	02-02-2022 03-02-2022		TLM2 TLM6	
14.	Making basic inferences, Strategies to uses text clues for comprehension	02	04-02-2022 09-02-2022		TLM2	
15.	Verbs :tenses, reporting verbs for academic purpose	02	10-02-2022 11-02-2022		TLM2	
16.	Summarizing rephrasing what is read	01	16-02-2022		TLM2	
17.	Avoiding redundancies and repetitions - Abstract Writing	02	17-02-2022 18-02-2022		TLM2 TLM6	
No. of classes required to complete UNIT-III: 08				**No. of classes 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	23-02-2022 24-02-2022		TLM2 TLM2	
19.	APJ Abdul Kalam Textual Exercises	01	25-02-022		TLM2	
20.	Direct-Indirect speech	01	02-03-2022		TLM2	
21.	Articles and their omission	01	03-03-2022		TLM2	
22.	E-mail drafting	02	04-03-2022 09-03-2022		TLM2 TLM6	
No. of classes required to complete UNIT-IV: 06				**No. of classes taken:**		

UNIT-V:

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.	C.V.Raman	02	10-03-2022 11-03-2022		TLM2	
24.	C.V.Raman	01	16-03-2022		TLM2	
25.	Subject – Verb agreement	01	23-03-2022		TLM2	
26.	Prepositions	01	24-03-2022		TLM2	
27.	Formal Letter Writing	02	25-03-2022		TLM2 TLM6	
No. of classes required to complete UNIT-V: 05				**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 (R17 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**M. Anuradha**	**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 : 2021-22
COURSE NAME & CODE : Differential Equations
L-T-P STRUCTURE : 4-0-0
COURSE CREDITS : 4
COURSE INSTRUCTOR : Dr.M. Srinivasa Reddy
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.

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

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
CO5	3	2	-	2	-	-	-	-	-	-	-	1

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

BOS APPROVED TEXT BOOKS:

T1 Dr. B.S. Grewal, "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, New Delhi, 2012.

T2 Dr. B. V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

BOS APPROVED REFERENCE BOOKS:

R1 M. D. Greenberg, "*Advanced Engineering Mathematics*", 2nd Edition, TMH Publications, New Delhi, 2011.

R2 Erwin Kreyszig, *"Advanced Engineering Mathematics"*, 8th Edition, John Wiley & sons, New Delhi, 2011.

R3 W.E. Boyce and R. C. Diprima, " *Elementary Differential Equations"* , 7th Edition, John Wiley & sons, New Delhi,2011.

R4 S. S. Sastry, *" Introductory Methods of Numerical Analysis"* 5th 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	13/12/2022		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
2.	Introduction to UNIT I	1	15/12/2021		TLM2	CO1	T1,T2	
3.	Formation of Differential Equations	1	16/12/2021		TLM1	CO1	T1,T2	
4.	Exact DE	1	17/12/2021		TLM1	CO1	T1,T2	
5.	Non-exact DE Type I	1	18/12/2021		TLM1	CO1	T1,T2	
6.	Non-exact DE Type II	1	20/12/2021		TLM1	CO1	T1,T2	
7.	Non-exact DE Type III	1	22/12/2021		TLM1	CO1	T1,T2	
8.	Non-exact DE Type IV	1	23/12/2021		TLM1	CO1	T1,T2	
9.	Orthogonal Trajectories (Cartesian)	1	27/12/2021		TLM1	CO1	T1,T2	
10.	Orthogonal Trajectories (Cartesian)	1	29/12/2021		TLM1	CO1	T1,T2	
11.	Orthogonal Trajectories (polar)	1	30/12/2021		TLM1	CO1	T1,T2	
12.	Orthogonal Trajectories (polar)	1	31/12/2021		TLM1	CO1	T1,T2	
13.	Problems	1	03/01/2022		TLM1	CO1	T1,T2	
14.	**TUTORIAL 1**	1	08/01/2022		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-I		13			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
15.	Introduction to UNIT II	1	05/01/2022		TLM2	CO2	T1,T2	
16.	Solving a homogeneous DE	1	06/01/2022		TLM1	CO2	T1,T2	
17.	Finding Particular Integral, P.I for e^{ax+b}	1	07/01/2022		TLM1	CO2	T1,T2	
18.	P.I for Cos bx or sin bx	1	10/01/2022		TLM1	CO2	T1,T2	
19.	P.I for polynomial function	1	12/01/2022		TLM1	CO2	T1,T2	
20.	P.I for $e^{ax+b}v(x)$	1	19/01/2022		TLM1	CO2	T1,T2	
21.	P.I for $e^{ax+b}v(x)$	1	20/01/2022		TLM1	CO2	T1,T2	
22.	P.I for $x^k v(x)$	1	21/01/2022		TLM1	CO2	T1,T2	
23.	P.I for $x^k v(x)$	1	22/01/2022		TLM1	CO2	T1,T2	
24.	Method of Variation of parameters	1	24/01/2022		TLM1	CO2	T1,T2	
25.	Method of Variation of	1	27/01/2022		TLM1	CO2	T1,T2	

	parameters							
26.	**TUTORIAL 2**	1	29/01/2022		TLM3	CO2	T1,T2	
No. of classes required to complete UNIT-II		12			No. of classes 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
27.	Introduction to Unit-III	1	28/01/2022		TLM2	CO3	T1,T2	
28.	Numerical Methods	1	31/01/2022		TLM1	CO3	T1,T2	
29.	Solution by Taylor's series	1	2/02/2022		TLM1	CO3	T1,T2	
30.	Solution by Taylor's series	1	03/02/2022		TLM1	CO3	T1,T2	
31.	Picard's Method	1	04/02/2022		TLM1	CO3	T1,T2	
32.	Picard's Method	1	05/02/2022		TLM1	CO3	T1,T2	
II MID EXAMINATIONS (07-02-2022 TO 12-02-2022)								
33.	Euler's Method	1	13/02/2022		TLM1	CO3	T1,T2	
34.	Modified Euler's Method	1	14/02/2022		TLM1	CO3	T1,T2	
35.	Modified Euler's Method	1	16/02/2022		TLM1	CO3	T1,T2	
36.	Runge- Kutta Method	1	17/02/2022		TLM1	CO3	T1,T2	
37.	Runge- Kutta Method	1	18/02/2022		TLM1	CO3	T1,T2	
38.	**TUTORIAL 3**	1	19/02/2022		TLM3	CO3	T1,T2	
No. of classes required to complete UNIT-III		12			No. of classes 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
39.	Introduction to UNIT IV	1	21/02/2022		TLM1	CO4	T1,T2	
40.	Generalized Mean Value Theorem, Taylor's series	1	23/02/2022		TLM1	CO4	T1,T2	
41.	Maclaurin's series	1	24/02/2022		TLM1	CO4	T1,T2	
42.	Functions of several variables	1	25/02/2022		TLM1	CO4	T1,T2	
43.	Jacobians(Cartesian coordinates)	1	28/02/2022		TLM1	CO4	T1,T2	
44.	Jacobians (polar, coordinates)	1	02/03/2022		TLM1	CO4	T1,T2	
45.	Jacobians (cylindrical, spherical coordinates)	1	03/03/2022		TLM1	CO4	T1,T2	
46.	Functional dependence	1	04/03/2022		TLM1	CO4	T1,T2	
47.	Maxima and Minima	1	05/03/2022		TLM1	CO4	T1,T2	
48.	Maxima and Minima of functions of two variables	1	07/03/2022		TLM1	CO4	T1,T2	

49.	Maxima and Minima of functions of two variables	1	09/03/2022		TLM1	CO4	T1,T2	
50.	**TUTORIAL 4**	1	19/03/2022		TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-IV		12			No. of classes 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
51.	Introduction to UNIT V	1	10/03/2022		TLM1	CO5	T1,T2	
52.	Partial Differential equations	1	11/03/2022		TLM1	CO5	T1,T2	
53.	Formation of PDE by elimination of arbitrary constants	1	14/03/2022		TLM1	CO5	T1,T2	
54.	Formation of PDE by elimination of arbitrary functions	1	16/03/2022		TLM1	CO5	T1,T2	
55.	Formation of PDE by elimination of arbitrary functions	1	17/03/2022		TLM1	CO5	T1,T2	
56.	Formation of PDE by elimination of arbitrary functions	1	21/03/2022		TLM1	CO5	T1,T2	
57.	General Method of solving PDE	1	23/03/2022		TLM3	CO5	T1,T2	
58.	Solving of PDE	1	24/03/2022		TLM1	CO5	T1,T2	
59.	Solving of PDE	1	25/03/2022		TLM1	CO5	T1,T2	
60.	Lagrange's Method	1	26/03/2022		TLM1	CO5	T1,T2	
61.	Lagrange's Method	1	28/03/2022		TLM1	CO5	T1,T2	
62.	**TUTORIAL 5**	1	30/03/2022		TLM3	CO5	T1,T2	
No. of classes required to complete UNIT-V		13			No. of classes taken:			

Contents beyond the Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
63.	Lagrange's Method	1	31/03/2022		TLM1	CO4	T1,T2	
64.	Solving of PDE other methods	1	1/04/2022		TLM5	CO5	T1,T2	
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (03-04-2021 TO 09-04-2021)								

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Dr.M.Srinivasa Reddy	**Dr. A. RAMI REDDY**	**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-C

ACADEMIC YEAR : 2021-2022

COURSE NAME & CODE : Applied Physics-20FE07

L-T-P STRUCTURE : 3-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr. S. YUSUB**

COURSE COORDINATOR : **Dr. S. YUSUB**

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.
CO2: Apply the lasers and optical fibres in different fields.
CO3: Estimate the electrical conductivity of metals.
CO4: 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	**FRESHMAN ENGINEERING DEPARTMENT**											
Course Outcomes PO's →	**Programme Outcomes**											
	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**
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., 2nd Edition, 2014.

REFERENCES

1. M.N. Avadhanulu, TVS Arun Murthy, "Applied *Physics*", S. Chand & Co., 2nd 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, 1st Edition, 2016.
4. Hitendra K Mallik , AK Singh " *Engineering Physics*", TMH, New Delhi, 1st Edition, 2009.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): ECE-C

UNIT-I : Interference and diffraction

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Course Outcomes Principle of superposition	1	14-12-2021		TLM1	CO1	T1	
2.	Coherence Conditions for interference	1	15-12-2021		TLM1	CO1	T1	
3.	Interference in thin films	1	16-12-2021		TLM1	CO1	T1	
4.	Newton's rings	1	17-12-2021		TLM1	CO1	T1	
5.	Michelson interferometer	1	21-12-2021		TLM1	CO1	T1	
6.	Fraunhofer diffraction Single slit	1	22-12-2021		TLM1	CO1	T1	
7.	Circular aperture	1	23-12-2021		TLM1	CO1	T1	
8.	Diffraction Grating, Resolving power of Grating	1	24-12-2021		TLM1	CO1	T1	
No. of classes required to complete UNIT-I		8			No. of classes taken:			

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
9.	Principle of laser, Characteristics of Laser.	1	28-12-2021		TLM1	CO2	T1	

10.	Einstein's coefficients	1	29-12-2021		TLM1	CO2	T1	
11.	NdYAG laser	1	30-12-2021		TLM1	CO2	T1	
12.	He-Ne laser	1	31-12-2021		TLM1	CO2	T1	
13.	Applications of lasers	1	04-01-2022		TLM1	CO2	T1	
14.	Optical Fiber principle	1	05-01-2022		TLM1	CO2	T1	
15.	Structure of optical fiber	1	06-01-2022		TLM1	CO2	T1	
16.	Tutorial-1	1	07-01-2022		TLM3	CO1	T1	
17.	Numerical Aperture and Acceptance angle	1	11-01-2022		TLM1	CO2	T1	
18.	Types of optical fibers, Applications	1	12-01-2022		TLM1	CO2	T1	
No. of classes required to complete UNIT-II		10			No. of classes 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 followed	HOD Sign Weekly
19	Introduction to Unit III, de-Broglie hypothesis	1	18-01-2022		TLM1	CO3	T1	
20	Davisson–Germer Experiment	1	19-01-2022		TLM1	CO3	T1	
21	Schrodinger wave equation,	1	20-01-2022		TLM1	CO3	T1	
22	Tutorial-2	1	21-01-2022		TLM3	CO2	T1	
23	physical significance of the wave function	1	25-01-2022		TLM1	CO3	T1	
24	particle in a box	1	27-01-2022		TLM1	CO3	T1	
25	Tutorial-3	1	28-01-2022		TLM3	CO3	T1	
26	particle in a box	1	01-02-2022		TLM1	CO3	T1	
27	Revision	1	02-02-2022		TLM1	CO1	T1	
28	Revision	1	03-02-2022		TLM1	CO2	T1	
29	Tutorial-4	1	04-02-2022		TLM3	CO3	T1	
30	**I MID**		07-02-2022			CO1, CO2,		

						CO3		
31	**I MID**		08-02-2022			CO1, CO2, CO3		
32	**I MID**		09-02-2022			CO1, CO2, CO3		
33	**I MID**		10-02-2022			CO1, CO2, CO3		
34	**I MID**		11-02-2022			CO1, CO2, CO3		
35	**I MID**		12-02-2022			CO1, CO2, CO3		
36	Classical free electron theory- Postulates, Expression for electrical conductivity and drift velocity,	1	15-02-2022		TLM1	CO3	T1	
37	Advantages and Draw backs,	1	16-02-2022		TLM1	CO3	T1	
38	Fermi-Dirac statistics,	1	17-02-2022		TLM1	CO3	T1	
39	Tutorial-5	1	18-02-2022		TLM3	CO3	T1	
40	Classification of Solids on the basis of Band theory.	1	22-02-2022		TLM1	CO3	T1	
No. of classes required to complete UNIT-III		16		No. of classes taken: 15				

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
41.	Introduction to unit IV, Semiconductors	1	23-02-2022		TLM1	CO4	T1	
42.	Carrier concentration in n-type semiconductor	1	24-02-2022		TLM1	CO4	T1	
43.	Tutorial-6	1	25-02-2022		TLM3	CO4	T1	
44.	Conductivity of intrinsic semiconductor	1	02-03-2022		TLM1	CO4	T1	

45.	Carrier concentration in p-type semiconductor,	1	03-03-2022		TLM1	CO4	T1	
46.	TUTORIAL-7	1	04-03-2022		TLM3	CO4	T1	
47.	Conductivity of extrinsic semiconductor	1	08-03-2022		TLM1	CO4	T1	
48.	Drift and diffusion Einstein relation,	1	09-03-2022		TLM1	CO4	T1	
49.	Hall effect,	1	10-03-2022		TLM1	CO4	T1	
50.	TUTORIAL-8	1	11-03-2022		TLM3	CO4	T1	
51.	Solar cell,	1	15-03-2022		TLM1	CO4	T1	
52.	Applications of solar cells,	1	16-03-2022		TLM1	CO4	T1	
53.	Direct and indirect band gap semiconductors	1	17-03-2022		TLM1	CO4	T1	
54.	TUTORIAL-9	1	18-03-2022		TLM3	CO4	T1	
No. of classes required to complete UNIT-IV		14			No. of classes taken: 14			

UNIT-V : MAGNETIC AND DIELECTRIC MATERIALS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
55.	Magnetic parameters, Classification of magnetic materials Diamagnetic, paramagnetic and ferromagnetic materials	1	22-03-2022		TLM1	CO5	T1	
56.	Hysteresis, soft and hard magnetic materials,	1	23-03-2022		TLM1	CO5	T1	
57.	Applications of Ferro magnetic materials	1	24-03-2022		TLM1	CO5	T1	
58.	TUTORIAL-10	1	25-03-2022		TLM3	CO5	T1	
59.	Electronic polarization Ionic polarization, Orientation polarization	1	29-03-2022		TLM1	CO5	T1	
60.	Local field, Clausius-Mossitti relation	1	30-03-2022		TLM1	CO5	T1	
61.	Applications of dielectric materials,	1	31-03-2022		TLM1	CO5	T1	
No. of classes required to complete UNIT-V		7			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
62.	SEM	1	01-04-2022		TLM1		R1	
63.	Nano materials	1	01-04-2022		TLM1		R1	
75	Mid II	1	04-04-2022			CO3, CO4, CO5		
76	Mid II	1	06-04-2022			CO3, CO4, CO5		
77	Mid II	1	07-04-2022			CO3, CO4, CO5		
78	Mid II	1	08-04-2022			CO3, CO4, CO5		
79	Mid II	1	09-04-2022			CO3, CO4, CO5		

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
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	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

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

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

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. T. Anil Raju
Course Name & Code : BASIC ELECTRICAL ENGINEERING-20EE01 **Regulation**: R20
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech. I-Sem., ECE C Sec **A.Y.:** 2020-21

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.

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	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** –Medium							**3** - 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, 3rd edition 2017.

R2 A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7th Edition, New Delhi 2017.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): ECE C 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	15-12-21		T1,R1	
2.	Active and Passive Elements	1	16-12-21		T1,R1	
3.	Independent and Dependent Sources	1	17-12-21		T1,R1	
4.	Ohm's Law and Kirchhoff's Laws, Series and Parallel Connection	1	18-12-21		T1,R1	
5.	Star to Delta & Delta to Star Transformations	1	22-12-21		T1,R1	
6.	Source Transformations	1	23-12-21		T1,R1	
7.	Mesh Analysis and Problems	1	29-12-21		T1,R1	
8.	Supermesh Analysis	1	30-12-21		T1,R1	
9.	Node analysis and Problems	1	31-12-21		T1,R1	
10.	Supernode Analysis	1	05-01-22		T1,R1	
11.	Duality and Dual networks.	1	06-01-22		T1,R1	
12.	Assignment-1	1	07-01-22		T1,R1	
No. of classes required to complete UNIT-I: 12				**No. of classes taken: 12**		

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
13.	Self ,Mutual inductance & Coefficient of Coupling, Dot Convention	1	08-01-22		T1,R1	
14.	Series and Parallel Inductance Circuits, Coupled circuits	1	06-01-22		T1,R1	
15.	R.M.S, Average Instantaneous Values, Phase and Phase Difference	1	10-01-22		T1,R1	
16.	Behavior of R, L and C Circuits.	1	17-01-22		T1,R1	
17.	Behavior of RL Series Circuit	1	20-01-22		T1,R1	
18.	Behavior of RC Series Circuit	1	21-01-22		T1,R1	
19.	Behavior of Series RLC Circuit	1	22-01-22		T1,R2	
20.	Behavior of Parallel RLC Circuit	1	24-01-22			
21.	Reactance and Susceptance	1	27-01-22		T1,R1	
22.	Impedance and Admittance	1	28-01-22		T1,R1	
23.	Real Power, Reactive Power, Apparent Power and Power Factor	1	29-01-22		T1,R1	
24.	Assignment-2	1	31-01-22		T1,R2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken: 12**		

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
25.	Superposition Theorem	1	02-02-22		T1,R1	
26.	Thevenin's Theorem & Norton's Theorem	1	03-02-22		T1,R1	
27.	Maximum Power Transfer Theorem	1	04-02-22		T1,R1	

28.	Reciprocity Theorem & Millman's Theorem	1	05-02-22		T1,R1	
29.	Series Resonant Circuit	1	16-02-22		T1,R1	
30.	Parallel Resonant Circuit	1	17-02-22		T1,R1	
31.	Band Width & Quality Factor	1	18-02-22		T1,R1	
32.	Assignment-3	1	19-02-22		T1,R1	
No. of classes required to complete UNIT-III: 08				**No. of classes taken:08**		

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
33.	Driving point and transfer functions	1	23-02-22		T1,R1	
34.	Poles and zeros of network functions	1	24-02-22		T1,R1	
35.	Restrictions of pole and zero locations	1	25-02-22		T1,R1	
36.	Driving point and transfer functions	1	26-02-22		T1,R1	
37.	Z, Y Parameters	1	02-02-22		T1,R1	
38.	ABCD & h-parameters	1	03-03-22		T1,R1	
39.	Inter-relationship between parameters	1	04-03-22		T1,R1	
40.	Series, Parallel and Cascade Connections	1	05-03-22		T1,R1	
41.	Assignment-4	1	09-03-22		T1,R1	
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
42.	Introduction to machines	1	10-03-22		T1,R1	
43.	Generator principle**,** Types of Generators	1	11-03-22			
44.	E.M.F Equation of a Generator	1	16-03-22		T1,R1	
45.	Motor principle, Significance of back e.m.f	1	17-03-22		T1,R1	
46.	Voltage equation of a motor	1	19-03-22		T1,R1	
47.	Brake Test on the DC shunt motor	1	23-03-22		T1,R1	
48.	Working principle of Transformer	1	24-03-22		T1,R1	
49.	Ideal Transformer and E.M.F Equation of a Transformer	1	25-03-22		T1,R1	
50.	Transformer Tests (OC and SC)	1	26-03-22		T1,R1	
51.	Electrical Safety: Definitions and precautions	1	30-03-22		T1,R1	
52.	Concepts of grounding and earthing		31-03-22		T1,R1	
53.	Assignment-V	1	01-04-22		T1,R1	
No. of classes required to complete UNIT-V: 12				**No. of classes taken:12**		

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

PART-D

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr .T.Anil Raju**	**Mr .T.Anil Raju**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
Signature				

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DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. Ch Siva Rama Krishna, Asst.Professor

Course Name & Code	**:** EDC-20EC01	**Regulation**: R20
L-T-P Structure	**:** 3-0-0	**Credits:** 03
Program/Sem/Sec	: B. Tech. I-Sem., ECE C Sec	**A.Y.:** 2021-22

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	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	-
1 - Low						**2** –Medium						**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 Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to course, Course Outcomes,	1	13-12-21			
2.	Introduction to UNIT-I	1	15-12-21			
3.	Qualitative theory of the p-n Junction	1	16-12-21			
4.	The Current components in a p-n Diode	1	17-12-21			
5.	The Volt- Ampere Characteristic	1	18-12-21			
6.	Diode Capacitance- Transition Capacitance	1	20-12-21			
7.	Diffusion Capacitance	1	22-12-21			
8.	Operation and characteristics of Zener Diode	1	23-12-21			
9.	Tunnel Diode	1	24-12-21			
10.	Solar cell	1	27-12-21			
11.	UJT	1	28-12-21			
12.	SCR	1	29-12-21			
No. of classes required to complete UNIT-I: 12				**No. of classes 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 Power supplies	1	30-12-21			
14.	Half wave Rectifiers	1	31-12-21			
15.	HWR parameters	1	03-01-22			
16.	Full wave Rectifiers	1	05-01-22			
17.	FWR parameters	1	06-01-22			
18.	Ripple removal using Capacitive	1	07-01-22			
19.	Inductive	1	10-01-22			
20.	L section	1	12-01-22			
21.	π section filters	1	19-01-22			
22.	Voltage Regulator using Zener diode	1	20-01-22			
23.	Clippers	2	21-01-22 22-01-22			
24.	Clampers	1	24-01-22			
No. of classes required to complete UNIT-II: 13				**No. of classes 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
25.	BJT-construction	1	27-01-22			
26.	Different regions of operations	1	28-01-22			
27.	Transistor Current components	1	29-01-22			
28.	Emitter Efficiency, Transport Factor, Large Signal Current Gain	1	31-01-22			
29.	Input characteristics of CB Configuration	1	02-02-22			
30.	Output characteristics of CB Configuration	1	03-02-22			
31.	Input characteristics of CE Configuration	1	04-02-22			
32.	Output characteristics of CE Configuration	1	05-02-22			
33.	Input characteristics of CC Configuration	1	14-02-22			
34.	Output characteristics of CC Configuration	1	16-02-22			
35.	Ebers moll model	1	17-02-22			
36.	Relation between α , β and γ	1	18-02-22			
No. of classes required to complete UNIT-III: 12				**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
37.	FET Construction	1	19-02-22			
38.	Classification of FET	1	21-02-22			
39.	Comparison between FET and BJT	1	23-02-22			
40.	Drain Characteristics of n-channel JFET	1	24-02-22			
41.	Transfer Characteristics of n-channel JFET	1	25-02-22			
42.	Drain Characteristics of p-channel JFET	1	26-02-22			
43.	Transfer Characteristics of p-channel JFET	1	28-02-22			
44.	n-channel enhancement MOSFET	1	02-03-22			
45.	Drain Characteristics of n-channel MOSFET	1	03-03-22			
46.	Transfer Characteristics of n-channel MOSFET	1	04-03-22			
47.	Drain Characteristics of p-channel MOSFET	1	05-03-22			
48.	Transfer Characteristics of p-channel MOSFET	1	07-03-22			
49.	MOS Capacitor	1	09-03-22			
No. of classes required to complete UNIT-IV: 13				**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
50.	Need for biasing; Operating Point	1	10-03-22			
51.	DC and AC load line	1	11-03-22			
52.	Stability factors S	1	14-03-22			
53.	Stability factors S'	1	16-03-22			
54.	Stability factors S"	1	17-03-22			
55.	Biasing circuits- Fixed bias	1	19-03-22			
56.	Problems on Fixed Bias	1	21-03-22			
57.	Collector to Base Bias	1	23-03-22			
58.	Self Bias	1	24-03-22			
59.	Thermal Runaway	1	25-03-22			
60.	Thermal Stability	1	26-03-22			
61.	Bias Compensation techniques.	1	28-03-22			
62.	FET biasing	1	30-03-22			
No.of classes required to complete UNIT-V: 12				**No. of classes taken:**		

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
52.	Diode applications	1	31-03-22		TLM1	

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

PART-C

EVALUATION PROCESS (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))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
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 fundamentals, and an engineering specialization to the solution of complex engineering problems
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. Ch Siva Rama Krishna**	**Mr. G. Venkata Rao**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
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 INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Mrs. M Anuradha
Course Name & Code **:** PCS LAB, 20FE51
L-T-P Structure **: 0-0-2** **Credits:** 01
Program/Sem/Sec :ECE (C – Sec) I SEM
A.Y. **:** 2021-22

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

CO1	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 questions about main idea and supporting ideas after listening to audio text.

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.
8.

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** –Medium						**3** - High				

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	02	14-12-2021		TLM4	
2.	Self Introduction & Introducing others	02	21-12-2021		TLM4	
3.	Self Introduction & Introducing others	02	28-12-2021		TLM4	
4.	JAM- I(Short and Structured Talks)	02	04-01-2022		TLM4	
5.	JAM-II(Short and Structured Talks)	02	11-01-2022		TLM4	
6.	JAM-II(Short and Structured Talks)	02	25-01-2022		TLM4	
7.	Role Play-I(Formal and Informal)	02	01-02-2022		TLM4	
8.	Role Play-II (Formal and Informal)	02	08-02-2022		TLM4	
9.	Role Play-II (Formal and Informal)	02	15-02-2022		TLM4	
10.	Group Discussion-I (Reporting the discussion)	02	22-02-2022		TLM4, TLM6	
11.	Group Discussion-II	02	01-03-2022		TLM4, TLM6	
12.	Group Discussion-II	02	08-03-2022		TLM4, TLM6	
13.	Group Discussion-II	02	15-03-2022		TLM4, TLM6	
14.	Oral & Poster Presentation	02	22-03-2022		TLM2, TLM4	
15.	Lab Internal Exam	02	22-03-2021			
No. of classes required to complete Syllabus: 26				**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	Marks
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering.
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands.
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**M. Anuradha**	**Dr. B. Samrajya Lakshmi**	**Dr. B. Samrajya Lakshmi**	**Dr. A. Ramireddy**
Signature				

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-C
ACADEMIC YEAR	**:**	2021-2022
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	**:**	**Dr. S. YUSUB**

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.
CO2: Estimate the magnetic field using Stewart's and Gee's apparatus.
CO3: Verify the characteristics of semi conductor diodes.
CO4: Determine the acceptance angle and numerical aperture of optical fiber.
CO5: Improve report writing skills and individual team work with ethical values.

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)		**2 = Moderate (Medium)**						**3 = Substantial (High)**				

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

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

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section- CSE-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	13-12-2021		**TLM4**	1,2,3,4	T1	
2.	Demonstration	3	20-12-2021		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
3.	Experiment 1	3	27-12-2021		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
4.	Experiment 2	3	03-01-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
5.	Experiment 3	3	10-01-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
6.	Experiment 4	3	24-01-2022		**TLM4**	CO1, CO2, CO3, CO4	T1	
7.	Experiment 5	3	31-01-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
8.	Demonstration	3	14-02-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
9.	Experiment 6	3	21-02-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
10.	Experiment 7	3	28-02-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
11.	Experiment 8	3	07-03-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	

12.	Experiment 16	3	14-03-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
13.	Experiment 10	3	21-03-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
14.	**Internal Exam**	3	28-03-2022		**TLM4**	CO1, CO2, CO3, CO4, CO5	T1	
No. of classes required to complete UNIT-I		42			No. of classes taken:			

EVALUATION PROCESS:

Evaluation Task	**Expt. no's**	**Marks**
Day to Day work = **A**	1,2,3,4,5,6,7,8	A=5
Internal test = **B**	1,2,3,4,5,6,7,8	B=5
Evaluation of viva voce = **C**	1,2,3,4,5,6,7,8	C = 5
Evaluation of attendance Marks = **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). **Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

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

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

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

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

PROGRAM SPECIFIC OUTCOMES (PSOs):

Graduate of the ECE will have the ability to

(1) Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.

(2) Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools

(3) Apply the Signal processing techniques to synthesize and realize the issues related to real time applications.

Dr. S. YUSUB / N. ARUNA	Dr. S. YUSUB	Dr. S. YUSUB	Dr A. RAMI REDDY
Course Instructor	Course Coordinator	Module Coordinator	HOD

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.T Anil Raju/Mr. N. Dharamchari
Course Name & Code : Basic Electrical Engineering Lab- 20EE51 **Regulation**:R20
L-T-P Structure : 0-0-3 **Credits:**1.5
Program/Sem/Sec : B.Tech., ECE., I-Sem., Section-C BATCH-1 **A.Y.:** 2021-22

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	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
CO4									2	3			0	0	0
1 - Low						**2** –Medium						**3** - 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, 3rd edition 2017.

R2 A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7th Edition, New Delhi 2017.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):C Section-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.	Lab Introduction	3	16-12-21			
2.	Kirchhoff's laws	3	23-12-21			
3.	Voltage & Current division rules	3	30-12-21			
4.	Superposition theorem	3	06-01-22			
5.	Thevenin's & Norton's theorem	3	20-01-22			
6.	Maximum power transfer theorem	3	27-01-22			
7.	Active and Reactive powers in a Single-phase series R-L/R-C circuits	3	03-02-22			
8.	Resonant frequency, Bandwidth and Quality factor of RLC circuits	3	17-02-22			
9.	Z-Parameters and Y-Parameters of two port network	3	24-02-22			
10.	DC shunt motor using break test	3	03-03-22			
11.	Efficiency of the single-phase transformer using OC and SC tests	3	10-03-22			
12.	Revision Lab	3	17-03-22			
13.	Internal Lab Examination		24-03-22			
No. of classes required to complete:10				**No. of classes taken:10**		

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. T.Anil Raju**	**Dr.B.Siva Hari Prasad**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.T Anil Raju/Mr. N. Dharamchari
Course Name & Code : Basic Electrical Engineering Lab- 20EE51 **Regulation**:R20
L-T-P Structure : 0-0-3 **Credits:**1.5
Program/Sem/Sec : B.Tech., ECE., I-Sem., Section-C BATCH-2 **A.Y.:** 2021-22

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	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
CO4									2	3			0	0	0
1 - Low						**2** –Medium						**3** - 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, 3rd edition 2017.

R2 A Sudhakar, Shyammohan S Palli, "Circuits and Networks, Analysis and Synthesis", McGraw Hill Education Pvt. Ltd,7th Edition, New Delhi 2017.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):C Section-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.	Kirchhoff's laws	3	18-12-21			
2.	Voltage & Current division rules	3	08-01-22			
3.	Superposition theorem	3	22-01-22			
4.	Thevenin's & Norton's theorem	3	29-01-22			
5.	Maximum power transfer theorem	3	05-02-22			
6.	Active and Reactive powers in a Single-phase series R-L/R-C circuits	3	19-02-22			
7.	Resonant frequency, Bandwidth and Quality factor of RLC circuits	3	26-02-22			
8.	Z-Parameters and Y-Parameters of two port network	3	05-03-22			
9.	DC shunt motor using break test	3	12-03-22			
10.	Efficiency of the single-phase transformer using OC and SC tests	3	19-03-22			
11.	Internal Lab Examination	3	26-03-22			
No. of classes required to complete:10				**No. of classes taken:10**		

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. T.Anil Raju**	**Dr.B.Siva Hari Prasad**	**Dr. G. Srinivasulu**	**Dr. Y. Amar Babu**
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DEPARTMENT OF ECE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.Ch Siva Rama Krishna, Asst.Professor

Course Name & Code : EDC Lab-20EC51 **Regulation**:R20
L-T-P Structure : 0-0-3 **Credits:** 1.5
Program/Sem/Sec : B. Tech. I-Sem., ECE C Sec **A.Y.:** 2021-22

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
CO2	Analyze the device parameters of Diodes, Bipolar Junction Transistors, and Field Effect 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	**1**	-
CO2	3	1	-	-	-	-	-	-	-	-	1	1	-	**2**	-
CO3	3	1	1	-	-	-	-	-	-	-	-	-	-	**2**	-
CO4	-	-	-	-	-	-	-	-	3	2	-	-	-	-	-
1 - Low					**2 –**Medium						**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): 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.	Identification of components, Active and Passive Devices, Study and operation of Regulated Power Supplies, CRO and Function generators	3	14-12-21			
2.	Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode using Characteristics	3	21-12-21			
3.	Realization and performance evaluation of Half wave rectifier with and without Capacitor filter	3	28-12-21			
4.	Realization and performance evaluation of Full wave rectifier with and without Capacitor filter	3	04-01-22			
5.	Analysis of Transistor CB Configuration for its Input and Output resistances and Current gains using VI Characteristics	3	11-01-22			
6.	Analysis of Transistor CE Configuration for its Input and Output resistances and Current gains using VI Characteristics	3	18-01-22			
7.	Analysis of Drain and Transfer Characteristics of Field Effect Transistor for its Drain Resistance, Transconductance and Amplification factor	3	25-01-22			
8.	Determination of Breakdown voltage of Zener diode and Design of Zener Voltage regulator	3	01-02-22			
9.	Design and Realization of Series Voltage Clippers with and without bias voltage	3	15-02-22			
10.	Design and Realization of Shunt Voltage Clippers with and without bias voltage	3	22-02-22			
11.	Design and Realization of Voltage Clampers circuits using Diode and capacitors	3	08-03-22			
12.	Internal Lab	3	29-03-22			
No. of classes required to complete : 24				**No. of classes taken:**		

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.	Identification of components, Active and Passive Devices, Study and operation of Regulated Power Supplies, CRO and Function generators	3	18-12-21			
2.	Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode using Characteristics	3	08-01-22			
3.	Realization and performance evaluation of Half wave rectifier with and without Capacitor filter	3	22-01-22			
4.	Realization and performance evaluation of Full wave rectifier with and without Capacitor filter	3	29-01-22			
5.	Analysis of Transistor CB Configuration for its Input and Output resistances and Current gains using VI Characteristics	3	05-02-22			
6.	Analysis of Transistor CE Configuration for its Input and Output resistances and Current gains using VI Characteristics	3	12-02-22			
7.	Analysis of Drain and Transfer Characteristics of Field Effect Transistor for its Drain Resistance, Transconductance and Amplification factor	3	19-02-22			
8.	Determination of Breakdown voltage of Zener diode and Design of Zener Voltage regulator	3	26-02-22			
9.	Design and Realization of Series Voltage Clippers with and without bias voltage	3	05-03-22			
10.	Design and Realization of Shunt Voltage Clippers with and without bias voltage	3	12-03-22			
11.	Design and Realization of Voltage Clampers circuits using Diode and capacitors	3	19-03-22			
12.	Internal Lab	3	26-03-22			
No. of classes required to complete : 24				**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**	1,2,3,4,5,6,7,8	B=05
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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):

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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

Date:

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr.Ch Siva Rama Krishna**	**Mr. G. Venkata Rao**	**Dr. G.Srinivasulu**	**Dr. Y. Amar Babu**
Signature				