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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

OURSE HANDOUT

PART-A

Name of Course Instructor : K.RAVI KIRAN YASASWI

Course Name & Code : **ENGINEERING ECONAMICS & ACCOUNTANCY** & 17HS01

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

Program/Sem/Sec : B.Tech., EEE., V-Sem., Section:A A.Y :2021-22

PRE-REQUISITE: Basic Sciences & Humanities

COURSE OBJECTIVE: The objective of this course is to inculcate basic knowledge to students relating to concepts of Engineering Economics and Accountancy to make them effective business decision makers.

Other course educational objectives of this course:

1. To know the concepts of engineering economics and to make them effective business decision makers.
2. To understand the concepts of production and cost for various business decision.
3. To understand the different types of market, market structures & pricing strategies and their applications in business decision making.
4. To explain the strategies of raising and utilization of business capital.
5. To understand the Fundamental of accounting and analysis of accounting statements for Managerial decision making.

COURSE OUTCOMES (CO)

Upon the Successful Completion of This Course Students Will Able To:

CO1: Capable of analyzing fundamentals of economics concepts which helps in effective business administration.
CO2: Discuss cost- output relationship in business operations.
CO3: Analyze the features of market structures and present the pricing policies.
CO4: Identify the types of Business organization of the company and the implementation Requirements of each one.
CO5: Financial position of the company can be analyzing with the help of financial statements.

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

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3							3	3	1	2	1				
CO2		3							2		2	1				
CO3					3		3		2		2	1				
CO4					3				2		2	1				
CO5					2		3	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 Aryasri: Managerial Econamics and Financial Analysis, MHE, 2014

BOS APPROVED REFERENCE BOOKS:

R1 Varshney &Maheswari : Managerial Econamics, Sultan Chand, 2003.

R2 AmbrishGuptha, Financial Accounting for Management, Pearson Education, New delhi.

R3 Lipey& Chrystal, Economics, Oxford University press.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT – I: introduction to Engineering Economics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
1.	Introduction to Subject, Course Outcomes Economics-definitions, nature & scope	01	20-09-2021		**TLM2**	CO1	T1	
2.	Branches of economics, engineering economics	01	22-09-2021		**TLM2**	CO1	T1	
3.	Features and scope.	01	24-09-2021		**TLM2**	CO1	T1	
4.	Demand- types, Demand determinants,	01	27-09-2021		**TLM2**	CO1	T1	
5.	Law of demand Exemption of law demand	01	29-09-2021		**TLM2**	CO1	T1	
6.	Elasticity of demand and its significance	01	01-10-2021		**TLM2**	CO1	T1	
7.	Types of elasticity of demand	01	04-10-2021		**TLM2**	CO1	T1	
8.	Demand forecasting types-factor governing-	01	06-10-2021		**TLM2**	CO1	T1	
9.	Methods of demand forecasting.	01	08-10-2021		**TLM2**	CO1	T1	
No. of classes required to complete UNIT-I		09			No. of classes taken:			

UNIT – II Theory of Production & Cost Analysis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Textbook followed	HOD Sign Weekly
10.	Introduction to Production	01	11-10-2021		**TLM2**	CO2	T1	
11.	Production function-Isoquant and Isocost.	01	18-10-2021		**TLM2**	CO2	T1	
12.	MRTS, least cost combination of inputs,	01	22-10-2021		**TLM2**	CO2	T1	
13.	Law of returns Internal economies of scale External economies of scale	01	25-10-2021		**TLM2**	CO2	T1	
14.	Cost analysis: cost concepts	01	27-10-2021		**TLM2**	CO2	T1	
15.	Cost & output relationship in short run & long run	01	29-10-2021		**TLM2**	CO2	T1	
16.	Break even analysis, determination of BEP, Problems in BEP	01	01-11-2021		**TLM2**	CO2	T1	
17.	Significance & limitation of BEA.	01	03-11-2021		**TLM2**	CO2	T1	
18.	Problems in BEP	01	05-11-2021		**TLM2**	CO2	T1	
19.	I MID EXAM		08-11-2021					
20.	I MID EXAM		10-11-2021					

21.	I MID EXAM		13-11-2021					
No. of classes required to complete UNIT-II		09		No. of classes taken:				

UNIT-III: Market Pricing Policies- Market structures.

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
22.	Introduction to Markets	01	15-11-2021		**TLM2**	CO3	T1	
23.	Types of markets features	01	17-11-2021		**TLM2**	CO3	T1	
24.	Price output determinations under perfect competitions.	01	19-11-2021		**TLM2**	CO3	T1	
25.	Monopoly, monopolistic competitions,.	01	22-11-2021		**TLM2**	CO3	T1	
26.	Oligopoly markets	01	24-11-2021		**TLM2**	CO3	T1	
27.	Pricing policies	01	26-11-2021		**TLM2**	CO3	T1	
28.	Pricing objectives	01	29-11-2021		**TLM2**	CO3	T1	
29.	Pricing methods and its Applications in business	01	01-12-2021		**TLM2**	CO3	T1	
No. of classes required to complete UNIT-III		08		No. of classes taken:				

UNIT IV – Capital & Capital Budgeting

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textboo k Followed	HOD Sign Weekly
30.	Introduction to UNIT-IV	01	03-12-2021		**TLM2**	CO4	T1	
31.	Capital & its significance- types of capital Estimation of fixed cost and working capital	01	06-12-2021		**TLM2**	CO4	T1	
32.	Components of working capital & factors determining the need of working capital	01	08-12-2021		**TLM2**	CO4	T1	
33.	Sources of raising working capital.	01	10-12-2021		**TLM2**	CO4	T1	
34.	Capital budgeting significance- process Techniques of capital budgeting:	01	13-12-2021		**TLM2**	CO4	T1	
35.	Methods of Capital budgeting.Pay- back period and ARR Problems	01	15-12-2021		**TLM2**	CO4	T1	
36.	NPV and Profitability index	01	17-12-2021		**TLM2**	CO4	T1	
37.	NPV and IRR problems	01	20-12-2021		**TLM2**	CO4	T1	
No. of classes required to complete UNIT-IV		08		No. of classes taken:				

UNIT-V Financial Accounting & Analysis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Textbook followed	HOD Sign Weekly
38.	Introduction to accounting	01	22-12-2021		TLM2	CO5	T1	
39.	Accounting significance-bookkeeping- double entry system	01	24-12-2021		TLM2	CO5	T1	
40.	Journal –Ledger -Trial balance	01	27-12-2021		TLM2	CO5	T1	
41.	Problems on Journal and Ledger	01	29-12-2021		TLM2	CO5	T1	
42.	Trial balance Problems	01	31-12-2021		TLM2	CO5	T1	
43.	Final accounts with simple adjustments	01	03-01-2022		TLM2	CO5	T1	
44.	Problems in Final accounts	01	05-01-2022		TLM2	CO5	T1	
45.	Problems in Final accounts	01	07-01-2022		TLM2	CO5	T1	
46.	Financial statement analysis through ratios.	01	10-01-2022		TLM2	CO5	T1	
47.	Problems on ratio analysis	01	12-01-2022		TLM2	CO5	T1	
48.	Problems on ratio analysis	01	14-01-2022		TLM2	CO5	T1	
49.	II MID EXAM		17-01-2022					
50.	II MID EXAM		19-01-2022					
51.	II MID EXAM		21-01-2022					
No. of classes required to complete UNIT-V		11		No. of classes taken:				

CONTENT BEYOND SYLLABUS

S.No	Topic	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
1	**Stock market analysis**	**1**	14/01/2022		

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)		

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	1W

II Phase of Instructions	15-11-2021	15-01-2022	9W
II Mid Examinations	17-01-2022	22-01-2022	1W
Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

Part - C

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment-1	1,2	A1=5
Assignment – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment – 3	3,4	A3=5
Assignment – 4	3	A4=5
Assignment – 5	3	A5=5
II-Mid Examination	3,4	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4	B=20
Cumulative Internal Examination : A+B	**1,2,3,4**	**A+B=40**
Semester End Examinations	**1,2,3,4**	**C=60**
Total Marks: A+B+C	**1,2,3,4**	**100**

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO 2	Design and analyze electrical machines, modern drive and lighting systems
PSO 3	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO 4	Design controllers for electrical and electronic systems to improve their performance

K.RAVIKIRAN YASASWI	Mr.U.Rambabu	Mr.U.Rambabu	Dr. A ADISESHA REDDY
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

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COURSE OUTCOMES (CO)

Upon the Successful Completion of This Course Students Will Able To:

CO1: Capable of analyzing fundamentals of economics concepts which helps in effective business administration.

CO2: Discuss cost- output relationship in business operations.

CO3: Analyze the features of market structures and present the pricing policies.

CO4: Identify the types of Business organization of the company and the implementation Requirements of each one.

CO5: Financial position of the company can be analyzing with the help of financial statements.

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

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3							3	3	1	2	1				
CO2		3							2		2	1				
CO3					3		3		2		2	1				
CO4					3				2		2	1				
CO5					2		3	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:

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BOS APPROVED REFERENCE BOOKS:

R1 Varshney &Maheswari : Managerial Econamics, Sultan Chand, 2003.

R2 AmbrishGuptha, Financial Accounting for Management, Pearson Education, New delhi.

R3 Lipey& Chrystal, Economics, Oxford University press.

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT – I: introduction to Engineering Economics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
1.	Introduction to Subject, Course Outcomes Economics-definitions, nature & scope	01	20-09-2021		**TLM2**	CO1	T1	
2.	Branches of economics, engineering economics	01	21-09-2021		**TLM2**	CO1	T1	
3.	Features and scope.	01	24-09-2021		**TLM2**	CO1	T1	
4.	Demand- types, Demand determinants,	01	28-09-2021		**TLM2**	CO1	T1	
5.	Law of demand Exemption of law demand	01	01-10-2021		**TLM2**	CO1	T1	
6.	Elasticity of demand and its significance	01	04-10-2021		**TLM2**	CO1	T1	
7.	Types of elasticity of demand	01	05-10-2021		**TLM2**	CO1	T1	
8.	Demand forecasting types-factor governing-	01	08-10-2021		**TLM2**	CO1	T1	
9.	Methods of demand forecasting.	01	11-10-2021		**TLM2**	CO1	T1	
No. of classes required to complete UNIT-I		09			No. of classes taken:			

UNIT – II Theory of Production & Cost Analysis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Textbook followed	HOD Sign Weekly
10.	Introduction to Production	01	18-10-2021		**TLM2**	CO2	T1	
11.	Production function-Isoquant and Isocost.	01	22-10-2021		**TLM2**	CO2	T1	
12.	MRTS, least cost combination of inputs,	01	25-10-2021		**TLM2**	CO2	T1	
13.	Law of returns Internal economies of scale External economies of scale	01	26-10-2021		**TLM2**	CO2	T1	
14.	Cost analysis: cost concepts	01	29-10-2021		**TLM2**	CO2	T1	
15.	Cost & output relationship in short run & long run	01	01-11-2021		**TLM2**	CO2	T1	
16.	Break even analysis, determination of BEP, Problems in BEP	01	02-11-2021		**TLM2**	CO2	T1	
17.	Significance & limitation of BEA. Problems in BEP	01	05-11-2021		**TLM2**	CO2	T1	
18.	I MID EXAM		08-11-2021					
19.	I MID EXAM		09-11-2021					
20.	I MID EXAM		13-11-2021					
No. of classes required to complete UNIT-II		08			No. of classes taken:			

UNIT-III: Market Pricing Policies- Market structures.

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
21.	Introduction to Markets	01	15-11-2021		**TLM2**	CO3	T1	
22.	Types of markets features	01	16-11-2021		**TLM2**	CO3	T1	
23.	Price output determinations under perfect competitions.	01	19-11-2021		**TLM2**	CO3	T1	
24.	Monopoly, monopolistic competitions,.	01	22-11-2021		**TLM2**	CO3	T1	
25.	Oligopoly markets	01	23-11-2021		**TLM2**	CO3	T1	
26.	Pricing policies	01	26-11-2021		**TLM2**	CO3	T1	
27.	Pricing objectives	01	29-11-2021		**TLM2**	CO3	T1	
28.	Pricing methods and its Applications in business	01	30-11-2021		**TLM2**	CO3	T1	
No. of classes required to complete UNIT-III		08		No. of classes taken:				

UNIT IV – Capital & Capital Budgeting

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textboo k Followed	HOD Sign Weekly
29.	Introduction to UNIT-IV	01	03-12-2021		**TLM2**	CO4	T1	
30.	Capital & its significance- types of capital Estimation of fixed cost and working capital	01	06-12-2021		**TLM2**	CO4	T1	
31.	Components of working capital & factors determining the need of working capital	01	07-12-2021		**TLM2**	CO4	T1	
32.	Sources of raising working capital.	01	10-12-2021		**TLM2**	CO4	T1	
33.	Capital budgeting significance- process Techniques of capital budgeting:	01	13-12-2021		**TLM2**	CO4	T1	
34.	Methods of Capital budgeting.Pay- back period and ARR Problems	01	14-12-2021		**TLM2**	CO4	T1	
35.	NPV and Profitability index	01	17-12-2021		**TLM2**	CO4	T1	
36.	NPV and IRR problems	01	20-12-2021		**TLM2**	CO4	T1	
No. of classes required to complete UNIT-IV		08		No. of classes taken:				

UNIT-V Financial Accounting & Analysis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Textbook followed	HOD Sign Weekly
37.	Introduction to accounting	01	21-12-2021		TLM2	CO5	T1	
38.	Accounting significance-bookkeeping- double entry system	01	24-12-2021		TLM2	CO5	T1	
39.	Journal –Ledger -Trial balance	01	27-12-2021		TLM2	CO5	T1	
40.	Problems on Journal and Ledger	01	28-12-2021		TLM2	CO5	T1	
41.	Trial balance Problems	01	31-12-2021		TLM2	CO5	T1	
42.	Final accounts with simple adjustments	01	03-01-2022		TLM2	CO5	T1	
43.	Problems in Final accounts	01	04-01-2022		TLM2	CO5	T1	
44.	Problems in Final accounts	01	07-01-2022		TLM2	CO5	T1	
45.	Financial statement analysis through ratios.	01	10-01-2022		TLM2	CO5	T1	
46.	Problems on ratio analysis	01	11-01-2022		TLM2	CO5	T1	
47.	Problems on ratio analysis	01	14-01-2022		TLM2	CO5	T1	
48.	II MID EXAM		17-01-2022					
49.	II MID EXAM		20-01-2022					
50.	II MID EXAM		21-01-2022					
No. of classes required to complete UNIT-V		06		No. of classes taken:				

CONTENT BEYOND SYLLABUS

S.No	Topic	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
1	Stock market analysis		14/01/2022		

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)		

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	1W
II Phase of Instructions	15-11-2021	15-01-2022	9W
II Mid Examinations	17-01-2022	22-01-2022	1W
Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

Part - C

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment-1	1,2	A1=5
Assignment – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment – 3	3,4	A3=5
Assignment – 4	3	A4=5
Assignment – 5	3	A5=5
II-Mid Examination	3,4	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4	B=20
Cumulative Internal Examination : A+B	**1,2,3,4**	**A+B=40**
Semester End Examinations	**1,2,3,4**	**C=60**
Total Marks: A+B+C	**1,2,3,4**	**100**

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO 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 teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO 2	Design and analyze electrical machines, modern drive and lighting systems
PSO 3	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO 4	Design controllers for electrical and electronic systems to improve their performance

K.RAVIKIRAN YASASWI	Mr.U.Rambabu	Mr.U.Rambabu	Dr. A ADISESHA REDDY
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS 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, V-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : Linear and Digital Integrated circuits - 17EE10

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr. B.Pangedaiah**

COURSE COORDINATOR : **Mr. B.Pangedaiah**

PRE-REQUISITES: Analog Electronics, Digital Electronics, Electric circuits-I

COURSE EDUCATIONAL OBJECTIVES (CEOs):

COURSE OUTCOMES (COs)

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

CO1: Analyze linear ICs for engineering applications
CO2: Design various Filters using their frequency bands
CO3: Design all combinational and Sequential circuits using Digital ICs
CO4: Compare various memory devices

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	3	-	3	-	-	-	-	-	-	-	-	-	-	3	2
CO2	3	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-
CO3	3	3	-	2	1	-	-	-	-	-	-	-	-	-	3	2
CO4	3	3	-	2	1	-	-	-	-	-	-	-	-	-	3	2

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

BOS APPROVED TEXT BOOKS:

T1 D. Roy Chowdhury, "Linear Integrated Circuits", New Age International (p) Ltd.

T2 Floyd and Jain, "Digital fundamentals", Pearson Education.

BOS APPROVED REFERENCE BOOKS:

R1 R.F. Coughlin and Fredrick F Driscoll, "Operational Amplifiers and Linear Integrated Circuits", PHI.

R2 Denton J. Daibey, "Operational Amplifiers and Linear Integrated Circuits: Theory and Applications", TMH.

R3 Serigo Franco, "Design with Operational amplifiers and Analog Integrated circuits", McGraw Hill.

R4 J. Michael Jacob, "Applications and Design with Analog Integrated Circuits", PHI.

R5 Ramakanth A. Gayakwad, "Op-Amp & Linear ICs", PHI.

Part - B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: Operational Amplifier

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 subject and awareness on COs	1	20-09-2021		**TLM1**	CO1	**T1**	
2.	Introduction to Unit-I: Basic Information of Op-Amp	1	21-09-2021		**TLM1**	CO1	**T1**	
3.	Ideal and practical Op-Amp	1	23-09-2021		**TLM1**	CO1	**T1**	
4.	Internal circuit of Op-Amp	1	25-09-2021		**TLM1**	CO1	**T1**	
5.	Op-Amp AC&DC characteristics	1	27-09-2021		**TLM1**	CO1	**T1**	
6.	741 Op-Amp and its features	1	28-09-2021		**TLM1**	CO1	**T1**	
7.	Tutorial-I	1	30-09-2021		**TLM3**	CO1	**T1**	
8.	Modes of operation-inverting, non inverting, differential	1	04-10-2021		**TLM1**	CO1	**T1**	
9.	Basic applications of Op-Amp	1	05-10-2021		**TLM1**	CO1	**T1**	
10.	Instrumentation amplifier	1	07-10-2021		**TLM1**	CO1	**T1**	
11.	Tutorial-II	1	11-10-2021		**TLM3**	CO1	**T1**	
12.	Log and anti log amplifiers, Sample and hold circuits, multipliers	1	18-10-2021		**TLM1**	CO1	**T1**	
13.	Dividers, differentiators Integrators, Comparators	1	21-10-2021		**TLM1**	CO1	**T1**	
14.	Schmitt trigger, multivibrators	1	23-10-2021		**TLM1**	CO1	**T1**	
15.	Assignment/Quiz-I	1	23-10-2021		**TLM6**	CO1		
No. of classes required to complete UNIT-I		14			No. of classes taken:			

UNIT-II: Active Filers and Oscillators

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
16.	Introduction to Unit-II: 1st order low pass filter, high pass filter	1	26-10-2021		**TLM1**	CO2	**T1,R5**	
17.	Band pass filter Band reject filter, All pass filter	1	28-10-2021		**TLM1**	CO2	**T1,R5**	
18.	Oscillators types and principle of operation, RC phase shift	1	30-10-2021		**TLM1**	CO1	**T1,R5**	

	oscillator							
19.	Tutorial-III	1	01-11-2021		**TLM3**	CO1	**T1,R5**	
20.	Wein and Quadrature Oscillators	1	02-11-2021		**TLM1**	CO1	**T1,R5**	
21.	Wave form generators-triangular, sawtooth	1	06-11-2021		**TLM1**	CO1	**T1,R5**	
22.	Wave form generators-Square	1	06-11-2021		**TLM1**	CO1	**T1,R5**	
23.	Assignment/Quiz-II	1			**TLM6**	CO1 & CO2		
No. of classes required to complete UNIT-II		8			No. of classes taken:			

UNIT-III: Timers & A/D-D/A Converters

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
24.	Introduction to Unit-III: 555 Timer, functional diagram	1	15-11-2021		**TLM1**	CO1	**T1**	
25.	Monostable and Astable operations and Applications	1	16-11-2021		**TLM1**	CO1	**T1**	
26.	Tutorial-IV	1	18-11-2021		**TLM3**	CO1	**T1**	
27.	VCO,PLL-introduction, block schematic	1	20-11-2021		**TLM1**	CO1	**T1**	
28.	Introduction to converters, Basic DAC techniques	1	22-11-2021		**TLM1**	CO1	**T1**	
29.	Weighted resistor and R-2R ladder DAC	1	23-11-2021		**TLM1**	CO1	**T1**	
30.	Inverted R-2R DAC , IC 1408 DAC, Types of ADCs: Parallel comparator type ADC	1	25-11-2021		**TLM1**	CO1	**T1**	
31.	Counter type, successive approximation ADC	1	27-11-2021		**TLM1**	CO1	**T1**	
32.	Tutorial-V	1	29-11-2021		**TLM3**	CO1	**T1**	
33.	Dual slop ADC, specifications of DAC and ADC	1	30-11-2021		**TLM1**	CO1	**T1**	
34.	Assignment/Quiz-III	1	02-12-2021		**TLM6**	CO1		
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV: Logic Families and Combinational Circuits

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
35.	Classification of integrated circuits, Comparision of various logic families	1	04-12-2021		**TLM1**	CO3	**T2**	

36.	Tutorial-VI	1	06-12-2021		**TLM1**	CO3	**T2**	
37.	Standard TTL NAND gate, analysis & Charecteristics	1	07-12-2021		**TLM1**	CO3	**T2**	
38.	TTL open collector O/Ps, tristate TTL,	1	09-12-2021		**TLM1**	CO3	**T2**	
39.	IC interfacing-TTL driving CMOS & CMOS driving TTL	1	13-12-2021		**TLM1**	CO3	**T2**	
40.	Tutorial-VII	1	14-12-2021		**TLM3**	CO3	**T2**	
41.	MOS and CMOS open drain and tristate outputs, CMOS transmission gate	1	16-12-2021		**TLM1**	CO3	**T2**	
42.	Design using TTL-74XX decoders, demux, Decoders & drivers for LED & LCD display, encoder	1	18-12-2021		**TLM1**	CO3	**T2**	
43.	Priority encoder, multiplexers & their applications Parity generator /checker circuits	1	20-12-2021		**TLM1**	CO3	**T2**	
44.	Parallel binary adder/subtractor circuit using 2's complement system and Digital comparator circuit	1	21-12-2021		**TLM1**	CO3	**T2**	
45.	Assignment/Quiz-IV	1	23-12-2021		**TLM6**	CO3		
No. of classes required to complete UNIT-IV		11			No. of classes taken:			

UNIT-V: Sequential Circuits and Memories

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
46.	74XX series of counters	1	27-12-2021		**TLM1**	CO3	**T2**	
47.	ROM architecture Types and ROM Applications	1	28-12-2021		**TLM1**	CO4	**T2**	
48.	RAM architecture, Static RAM	1	30-12-2021		**TLM1**	CO4	**T2**	
49.	Dynamic RAMs		04-01-2022					
50.	Synchronous DRAMs	1	06-01-2022		**TLM1**	CO4	**T2**	
51.	Tutorial-VIII	1	08-01-2022		**TLM3**	CO4	**T2**	
No. of classes required to complete UNIT-V		6			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
1.	Features of 723	1	10-01-2022		**TLM1**	CO1	**T1**	
2.	CMOS 40XX series Code converters	1	11-01-2022		**TLM1**	CO3	**T2**	
3.	CMOS 40XX series of counters	1	13-01-2022		**TLM1**	CO4	**T2**	

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

Part - C

EVALUATION PROCESS:

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20/09/2021	06/11/2021	8W
I Mid Examinations	08/11/2021	13/11/2021	
II Phase of Instructions	15/11/2021	15/01/2022	10W
II Mid Examinations	17/01/2022	22/01/2022	
Preparation and Practicals	24/01/2022	29/01/2022	1W
Semester End Examinations	31/01/2022	12/02/2022	2W

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3. Work effectively as individuals and as team members in multidisciplinary projects.

PEO4. Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAMME OUTCOMES (POs)

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

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

c: 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.

d: 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.

e: 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.

f: 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.

g: 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.

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

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

j: 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.

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power

PSO-b: Design and analyze electrical machines, modern drive and lighting systems

PSO-c: Specify, design, implement and test analog and embedded signal processing electronic systems

PSO-d: Design controllers for electrical and electronic systems to improve their performance.

Course Instructor	Course Coordinator	Module Coordinator	HOD

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

Part - A

PROGRAM : B.Tech, V-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : Linear and Digital Integrated circuits - 17EE10

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr. B. Pangedaiah**

COURSE COORDINATOR : **Mr. B. Pangedaiah**

PRE-REQUISITES: Analog Electronics, Digital Electronics, Electric circuits-I

COURSE EDUCATIONAL OBJECTIVES (CEOs):

COURSE OUTCOMES (COs)

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

CO1: Analyze linear ICs for engineering applications
CO2: Design various Filters using their frequency bands
CO3: Design all combinational and Sequential circuits using Digital ICs
CO4: Compare various memory devices

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3	3	-	3	-	-	-	-	-	-	-	-	-	-	3	2
CO2	3	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-
CO3	3	3	-	2	1	-	-	-	-	-	-	-	-	-	3	2
CO4	3	3	-	2	1	-	-	-	-	-	-	-	-	-	3	2

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

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T2 Floyd and Jain, "Digital fundamentals", Pearson Education.

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R2 Denton J. Daibey, "Operational Amplifiers and Linear Integrated Circuits: Theory and Applications", TMH.

R3 Serigo Franco, "Design with Operational amplifiers and Analog Integrated circuits", McGraw Hill.

R4 J. Michael Jacob, "Applications and Design with Analog Integrated Circuits", PHI.

R5 Ramakanth A. Gayakwad, "Op-Amp & Linear ICs", PHI.

Part - B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I: Operational Amplifier

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 subject and awareness on COs	1	22-09-2021		**TLM1**	CO1	**T1**	
2.	Introduction to Unit-I: Basic Information of Op-Amp	1	23-09-2021		**TLM1**	CO1	**T1**	
3.	Ideal and practical Op-Amp	1	24-09-2021		**TLM1**	CO1	**T1**	
4.	Internal circuit of Op-Amp	1	25-09-2021		**TLM1**	CO1	**T1**	
5.	Op-Amp AC&DC characteristics	1	29-09-2021		**TLM1**	CO1	**T1**	
6.	741 Op-Amp and its features	1	30-09-2021		**TLM1**	CO1	**T1**	
7.	Tutorial-I	1	01-10-2021		**TLM3**	CO1	**T1**	
8.	Modes of operation-inverting, non inverting, differential	1	06-10-2021		**TLM1**	CO1	**T1**	
9.	Basic applications of Op-Amp	1	07-10-2021		**TLM1**	CO1	**T1**	
10.	Instrumentation amplifier	1	08-10-2021		**TLM1**	CO1	**T1**	
11.	Tutorial-II	1	20-10-2021		**TLM3**	CO1	**T1**	
12.	Log and anti log amplifiers, Sample and hold circuits, multipliers	1	21-10-2021		**TLM1**	CO1	**T1**	
13.	Dividers, differentiators Integrators, Comparators	1	22-10-2021		**TLM1**	CO1	**T1**	
14.	Schmitt trigger, multivibrators	1	23-10-2021		**TLM1**	CO1	**T1**	
15.	Assignment/Quiz-I	1	27-10-2021		**TLM6**	CO1		
No. of classes required to complete UNIT-I		14			No. of classes taken:			

UNIT-II: Active Filers and Oscillators

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
16.	Introduction to Unit-II: 1st order low pass filter, high pass filter	1	28-10-2021		**TLM1**	CO2	**T1,R5**	
17.	Band pass filter Band reject filter, All pass filter	1	29-10-2021		**TLM1**	CO2	**T1,R5**	
18.	Oscillators types and principle of operation, RC phase	1	30-10-2021		**TLM1**	CO1	**T1,R5**	

	shift oscillator							
19.	Tutorial-III	1	03-11-2021		**TLM3**	CO1	**T1,R5**	
20.	Wein and Quadrature Oscillators	1	05-11-2021		**TLM1**	CO1	**T1,R5**	
21.	Wave form generators-triangular, sawtooth	1	06-11-2021		**TLM1**	CO1	**T1,R5**	
22.	Wave form generators-Square	1	06-11-2021		**TLM1**	CO1	**T1,R5**	
23.	Assignment/Quiz-II	1			**TLM6**	CO1 & CO2		
No. of classes required to complete UNIT-II		8			No. of classes taken:			

UNIT-III: Timers & A/D-D/A Converters

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
24.	Introduction to Unit-III: 555 Timer, functional diagram	1	17-11-2021		**TLM1**	CO1	**T1**	
25.	Monostable and Astable operations and Applications	1	18-11-2021		**TLM1**	CO1	**T1**	
26.	Tutorial-IV	1	19-11-2021		**TLM3**	CO1	**T1**	
27.	VCO,PLL-introduction, block schematic	1	20-11-2021		**TLM1**	CO1	**T1**	
28.	Introduction to converters, Basic DAC techniques	1	24-11-2021		**TLM1**	CO1	**T1**	
29.	Weighted resistor and R-2R ladder DAC	1	25-11-2021		**TLM1**	CO1	**T1**	
30.	Inverted R-2R DAC , IC 1408 DAC, Types of ADCs: Parallel comparator type ADC	1	26-11-2021		**TLM1**	CO1	**T1**	
31.	Counter type, successive approximation ADC	1	27-11-2021		**TLM1**	CO1	**T1**	
32.	Tutorial-V	1	01-12-2021		**TLM3**	CO1	**T1**	
33.	Dual slop ADC, specifications of DAC and ADC	1	02-12-2021		**TLM1**	CO1	**T1**	
34.	Assignment/Quiz-III	1	03-12-2021		**TLM6**	CO1		
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV: Logic Families and Combinational Circuits

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
35.	Classification of integrated circuits, Comparision of various logic families	1	04-12-2021		**TLM1**	CO3	**T2**	

36.	Tutorial-VI	1	08-12-2021		**TLM1**	CO3	**T2**	
37.	Standard TTL NAND gate, analysis & Charecteristics	1	09-12-2021		**TLM1**	CO3	**T2**	
38.	TTL open collector O/Ps, tristate TTL,	1	10-12-2021		**TLM1**	CO3	**T2**	
39.	IC interfacing-TTL driving CMOS & CMOS driving TTL	1	15-12-2021		**TLM1**	CO3	**T2**	
40.	Tutorial-VII	1	16-12-2021		**TLM3**	CO3	**T2**	
41.	MOS and CMOS open drain and tristate outputs, CMOS transmission gate	1	17-12-2021		**TLM1**	CO3	**T2**	
42.	Design using TTL-74XX decoders, demux, Decoders & drivers for LED & LCD display, encoder	1	18-12-2021		**TLM1**	CO3	**T2**	
43.	Priority encoder, multiplexers & their applications Parity generator /checker circuits	1	22-12-2021		**TLM1**	CO3	**T2**	
44.	Parallel binary adder/subtractor circuit using 2's complement system and Digital comparator circuit	1	23-12-2021		**TLM1**	CO3	**T2**	
45.	Assignment/Quiz-IV	1	24-12-2021		**TLM6**	CO3		
No. of classes required to complete UNIT-IV		11			No. of classes taken:			

UNIT-V: Sequential Circuits and Memories

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
46.	74XX series of counters	1	29-12-2021		**TLM1**	CO3	**T2**	
47.	ROM architecture	1	30-12-2021		**TLM1**	CO4	**T2**	
48.	Types and ROM Applications	1	31-12-2021		**TLM1**	CO4	**T2**	
49.	RAM architecture, Static RAM	1	05-01-2022		**TLM1**	CO4	**T2**	
50.	Dynamic RAMs	1	06-01-2022		**TLM1**	CO4	**T2**	
51.	Synchronous DRAMs	1	07-01-2022		**TLM1**	CO4	**T2**	
52.	Tutorial-VIII	1	08-01-2022		**TLM3**	CO4	**T2**	
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
1.	Features of 723	1	12-01-2022		**TLM1**	CO1	**T1**	
2.	CMOS 40XX series Code converters	1	13-01-2022		**TLM1**	CO3	**T2**	
3.	CMOS 40XX series of counters	1	14-01-2022		**TLM1**	CO4	**T2**	

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

Part - C

EVALUATION PROCESS:

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20/09/2021	06/11/2021	8W
I Mid Examinations	08/11/2021	13/11/2021	
II Phase of Instructions	15/11/2021	15/01/2022	10W
II Mid Examinations	17/01/2022	22/01/2022	
Preparation and Practicals	24/01/2022	29/01/2022	1W
Semester End Examinations	31/01/2022	12/02/2022	2W

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3. Work effectively as individuals and as team members in multidisciplinary projects.

PEO4. Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAMME OUTCOMES (POs)

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

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

c: 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.

d: 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.

e: 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.

f: 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.

g: 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.

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

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

j: 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.

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power

PSO-b: Design and analyze electrical machines, modern drive and lighting systems

PSO-c: Specify, design, implement and test analog and embedded signal processing electronic systems

PSO-d: Design controllers for electrical and electronic systems to improve their performance.

Course Instructor	Course Coordinator	Module Coordinator	HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Autonomous & Affiliated to JNTUK, Kakinada& Approved by AICTE, New Delhi,
NAAC Accredited with 'B++' 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., V-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : Electrical Machines-II - 17EE11

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr.K.NAGALINGA CHARY**

COURSE COORDINATOR : **Mr.K.NAGALINGA CHARY**

Prerequisite: Network Theory-II(17EE07) andElectrical Machines-I(17EE09)

Course Educational Objectives: This course enables the student to

- Understand the analysis and performance of single phase and poly phase Induction motors which are the major part of domestic appliances, control systems, drives and agricultural pump sets.
- Deal with detailed analysis of synchronous generators and motors which are the prime sources of electrical power generation.

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

CO1:	Interpret the construction and principle of operation of Induction and synchronous machines
CO2:	Analyze the performance of poly phase Induction and synchronous machines.
CO3:	Analyze the performance of Single phase Induction Machine
CO4:	Investigate the effect of excitation and load on synchronous machine operation

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		2										3
CO2	3	2	3		2										3
CO3	3	2	3		2										3
CO4	3														3

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 P.S. Bimbra. ,"Electrical Machines", Khanna Publishers, 7th Edition. 2011.

T2 I.J.Nagrath&D.P.Kothari, "Electric Machines", Tata Mc Graw Hill, 7th Edition.2010

BOS APPROVED REFERENCE BOOKS:

R1: M.G. Say ,"Alternating Current Machines", John Wiley & Sons, 1976.
R2: A. E. Fitzgerald, C. Kingsley and S. Umans, "Electric Machinery", Mc Graw-Hill Companies, 6th edition 2017.
R3: Ashfaq Husain ,"Electric Machines", DhanapatiRai&Co, New Delhi, 3rd edition ,2017..
R4: Soft Starter Handbook, ABB Group.

Part - B
COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : THREE PHASE INDUCTION MOTORS

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 Subject & Course Outcomes	1	20/09/2021		TLM2	CO1	T2	
2.	Stator construction, Rotor construction details & Types	1	22/09/2021		TLM2	CO1	T2	
3.	Working principle of three phase IM	1	24/09/2021		TLM2	CO1	T2	
4.	**Tutorial-I**	1	25/09/2021		TLM3			
5.	Production of rotating magnetic field, Synchronous speed,Slip equation	1	27/09/2021		TLM2	CO1	T2	
6.	Rotor emf and rotor frequency,	1	29/09/2021		TLM2	CO1	T2	
7.	Rotor reactance, rotor current and power factor	1	01/10/2021		TLM2	CO1	T2	
8.	Phasor diagram of three phase IM	1	04/10/2021		TLM2	CO1	T2	
9.	Equivalent circuit of three phase IM	1	06/10/2021		TLM2	CO1	T2	
10.	Crawling and cogging	1	08/10/2021		TLM2	CO1	T2	
11.	**Tutorial-II**	1	09/10/2021		TLM3			
12.	Revision	1	11/10/2021		TLM2	CO1	T2	
13.	**Quiz-I /ASSIGNMENT-I**	1	18/10/2021		TLM6			
No. of classes required to complete UNIT-I		13			No. of classes taken:			

UNIT-II : PERFORMANCE OF INDUCTION MOTORS

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
14.	Power stages - Rotor power input,	1	22/10/2021		TLM2	CO2	T1	

	rotor copper loss and mechanical power developed and their inter relation							
15.	Torque equation-expressions for starting torque and running torque-condition for maximum torque	1	23/10/2021		TLM2	CO2	T1	
16.	Torque-slip characteristics	1	25/10/2021		TLM2	CO2	T1	
17.	Losses and efficiency	1	27/10/2021		TLM2	CO2	T1	
18.	Starting methods of Three Phase IM	1	29/10/2021		TLM2	CO2	T1	
19.	**Tutorial-III**	1	30/10/2021		TLM3			
20.	No load and blocked rotor tests –equivalent circuit	1	01/11/2021		TLM2	CO2	T1	
21.	Circle Diagram	1	03/11/2021		TLM2	CO2	T1	
22.	Operation of induction motor as induction generator	1	05/11/2021		TLM2	CO2	T1	
23.	**Tutorial-IV**	1	06/11/2021		TLM3			
24.	Revision	1	15/11/2021		TLM2	CO2	T1	
25.	**Quiz-II/ ASSIGNMENT-II**	1	17/11/2021		TLM6			
26.	MID-I		08/11/2021					
27.	MID-I		10/11/2021					
28.	MID-I		12/11/2021					
29.	MID-I		13/11/2021					
No. of classes required to complete UNIT-II		12			No. of classes taken:			

UNIT-III : SINGLE PHASE INDUCTION MOTORS

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
30.	Principle,operation - Double revolving field theory	1	19/11/2021		TLM2	CO3	T1	
31.	Split phase induction motor	1	20/11/2021		TLM2	CO3	T1	
32.	Capacitor start and run induction motors	1	22/11/2021		TLM2	CO3	T1	
33.	Shaded pole induction motor	1	24/11/2021		TLM2	CO3	T1	
34.	Equivalent circuit	1	26/11/2021		TLM2	CO3	T1	
35.	**Tutorial-V**	1	27/11/2021		TLM3			

36.	Revision	1	29/11/2021		TLM2	CO3	T1	
37.	**Quiz-III/ ASSIGNMENT-III**	1	01/12/2021		TLM6			
No. of classes required to complete UNIT-III		08			No. of classes taken:			

UNIT-IV : SYNCHRONOUS GENERATORS

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
38.	Construction ofsynchronous generators & Types of rotor	1	03/12/2021		TLM2	CO3	R5	
39.	Working principle & EMF equation	1	04/12/2021		TLM2	CO3	R5	
40.	Armature reaction	1	06/12/2021		TLM2	CO3	R5	
41.	Phasor diagram of alternator	1	08/12/2021		TLM2	CO3	R5	
42.	Regulation Methods–EMF, MMF,ZPF methods	1	10/12/2021		TLM2	CO3	R5	
43.	**Tutorial-VI**	1	11/12/2021		TLM3			
44.	Synchronizing to infinite bus bars	1	13/12/2021		TLM2	CO3	R5	
45.	Two reaction theory	1	15/12/2021		TLM2	CO3	R5	
46.	Parallel operation of synchronous generators	1	17/12/2021		TLM2	CO3	R5	
47.	**Tutorial-VII**	1	18/12/2021		TLM3			
48.	Synchronous Machine constants	1	20/12/2021		TLM2	CO3	R5	
49.	Revision	1	22/12/2021		TLM2	CO3	R5	
50.	**Quiz-IV/ ASSIGNMENT-IV**	1	24/12/2021		TLM6			
No. of classes required to complete UNIT-IV		13			No. of classes taken:			

UNIT-V:SYNCHRONOUS MOTORS

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.	Constructional features, principle of operation	1	27/12/2021		TLM2	CO3	R5	
52.	Methods of starting	1	29/12/2021		TLM2	CO3	R5	
53.	Power developed, Effect of increased load with constant excitation	1	31/12/2021		TLM2	CO4	R5	
54.	**Tutorial-VIII**	1	01/01/2022		TLM3			
55.	Synchronous motor with	1	03/01/2022		TLM2	CO4	R5	

	different excitations							
56.	Effect of changing excitation constant load& Torque equation	1	05/01/2022		TLM2	CO4	R5	
57.	V curve and inverted V curve – hunting	1	07/01/2022		TLM2	CO3	R5	
58.	**Tutorial-IX**	1	08/01/2022		TLM3			
59.	**Quiz-V/ ASSIGNMENT-V**	1	10/01/2022		TLM6			
60.	MID-II		17/01/2022					
61.	MID-II		18/01/2022					
62.	MID-II		21/01/2022					
63.	MID-II		22/01/2022					
No. of classes required to complete UNIT-V		9			No. of classes taken:			

CONTENT BEYOND SYLLABUS

S.No	Topic	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
1			12/01/2022		

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)		

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	1W
II Phase of Instructions	15-11-2021	15-01-2022	9W
II Mid Examinations	17-01-2022	22-01-2022	1W
Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

Part - C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment-1	1,2	A1=5
Assignment – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment – 3	3,4	A3=5
Assignment – 4	3	A4=5
Assignment – 5	3	A5=5
II-Mid Examination	3,4	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4	B=20
Cumulative Internal Examination : A+B	**1,2,3,4**	**A+B=40**
Semester End Examinations	**1,2,3,4**	**C=60**
Total Marks: A+B+C	**1,2,3,4**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3. Work effectively as individuals and as team members in multidisciplinary projects.

PEO4. Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAMME OUTCOMES (POs)

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

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

c: 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.

d: 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.

e: 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.

f: 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.

g: 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.

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

i: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in

multidisciplinary settings.

j: 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.

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

l: 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.

PSOs (Program specific Outcomes):

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power

PSO-b: Design and analyze electrical machines, modern drive and lighting systems

PSO-c: Specify, design, implement and test analog and embedded signal processing electronic systems

PSO-d: Design controllers for electrical and electronic systems to improve their performance.

K.NAGALINGA CHARY	K.NAGALINGA CHARY		Dr.J.SIVAVARA PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD

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., V-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : Electrical Machines-II - 17EE11

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr.K.NAGALINGA CHARY**

COURSE COORDINATOR : **Mr.K.NAGALINGA CHARY**

Prerequisite: Network Theory-II(17EE07) andElectrical Machines-I(17EE09)

Course Educational Objectives: This course enables the student to

- Understand the analysis and performance of single phase and poly phase Induction motors which are the major part of domestic appliances, control systems, drives and agricultural pump sets.
- Deal with detailed analysis of synchronous generators and motors which are the prime sources of electrical power generation.

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

CO1:	Interpret the construction and principle of operation of Induction and synchronous machines
CO2:	Analyze the performance of poly phase Induction and synchronous machines.
CO3:	Analyze the performance of Single phase Induction Machine
CO4:	Investigate the effect of excitation and load on synchronous machine operation

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		2										3
CO2	3	2	3		2										3
CO3	3	2	3		2										3
CO4	3														3

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 P.S. Bimbra. ,"Electrical Machines", Khanna Publishers, 7th Edition. 2011.

T2 I.J.Nagrath&D.P.Kothari, "Electric Machines", Tata Mc Graw Hill, 7th Edition.2010

BOS APPROVED REFERENCE BOOKS:

R5: M.G. Say ,"Alternating Current Machines", John Wiley & Sons, 1976.
R6: A. E. Fitzgerald, C. Kingsley and S. Umans, "Electric Machinery", Mc Graw-Hill Companies, 6th edition 2017.
R7: Ashfaq Husain ,"Electric Machines", DhanapatiRai&Co, New Delhi, 3rdedition ,2017..
R8: Soft Starter Handbook, ABB Group.

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

UNIT-I :THREE PHASE INDUCTION MOTORS

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 Subject & Course Outcomes	1	20/09/2021		TLM2	CO1	T2	
2.	Stator construction, Rotor construction details & Types	1	21/09/2021		TLM2	CO1	T2	
3.	Working principle of three phase IM	1	24/09/2021		TLM2	CO1	T2	
4.	Production of rotating magnetic field, Synchronous speed,Slip equation	1	25/09/2021		TLM2	CO1	T2	
5.	**Tutorial-I**	1	27/09/2021		TLM3			
6.	Rotor emf and rotor frequency,	1	28/09/2021		TLM2	CO1	T2	
7.	Rotor reactance, rotor current and power factor	1	01/10/2021		TLM2	CO1	T2	
8.	Phasor diagram of three phase IM	1	04/10/2021		TLM2	CO1	T2	
9.	Equivalent circuit of three phase IM	1	05/10/2021		TLM2	CO1	T2	
10.	Crawling and cogging	1	08/10/2021		TLM2	CO1	T2	
11.	Revision	1	09/10/2021		TLM2	CO1	T2	
12.	**Tutorial-II**	1	11/10/2021		TLM3			
13.	**Quiz-I /ASSIGNMENT-I**	1	12/10/2021		TLM6			
No. of classes required to complete UNIT-I		13			No. of classes taken:			

UNIT-II :PERFORMANCE OF INDUCTION MOTORS

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
14.	Power stages - Rotor power input, rotor copper loss	1	18/10/2021		TLM2	CO2	T1	

	and mechanical power developed and their inter relation							
15.	Torque equation-expressions for starting torque and running torque-condition for maximum torque	1	19/10/2021		TLM2	CO2	T1	
16.	Torque-slip characteristics	1	22/10/2021		TLM2	CO2	T1	
17.	Losses and efficiency	1	23/10/2021		TLM2	CO2	T1	
18.	**Tutorial-III**	1	25/10/2021		TLM3			
19.	Starting methods of Three Phase IM	2	26/10/2021 29/10/2021		TLM2	CO2	T1	
20.	No load and blocked rotor tests –equivalent circuit	1	30/10/2021		TLM2	CO2	T1	
21.	Circle Diagram	2	01/11/2021 02/11/2021		TLM2	CO2	T1	
22.	Operation of induction motor as induction generator	1	05/11/2021		TLM2	CO2	T1	
23.	Revision	1	06/11/2021		TLM2	CO2	T1	
24.	**Tutorial-IV**	1	15/11/2021		TLM3			
25.	**Quiz-II/ ASSIGNMENT-II**	1	16/11/2021		TLM6			
26.	MID-I		08/11/2021					
27.	MID-I		09/11/2021					
28.	MID-I		12/11/2021					
29.	MID-I		13/11/2021					
No. of classes required to complete UNIT-II		14			No. of classes taken:			

UNIT-III :SINGLE PHASE INDUCTION MOTORS

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
30.	Principle,operation - Double revolving field theory	1	19/11/2021		TLM2	CO3	T1	
31.	Split phase induction motor	1	20/11/2021		TLM2	CO3	T1	
32.	Capacitor start and run induction motors	1	22/11/2021		TLM2	CO3	T1	
33.	Shaded pole induction motor	1	23/11/2021		TLM2	CO3	T1	
34.	Equivalent circuit	1	26/11/2021		TLM2	CO3	T1	
35.	Revision	1	27/11/2021		TLM2	CO3	T1	

36.	**Tutorial-V**	1	29/11/2021		TLM3			
37.	**Quiz-III/ ASSIGNMENT-III**	1	30/11/2021		TLM6			
No. of classes required to complete UNIT-III		08			No. of classes taken:			

UNIT-IV :SYNCHRONOUS GENERATORS

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
38.	Construction ofsynchronous generators & Types of rotor	1	03/12/2021		TLM2	CO3	R5	
39.	Working principle & EMF equation	1	04/12/2021		TLM2	CO3	R5	
40.	Armature reaction	1	06/12/2021		TLM2	CO3	R5	
41.	Phasor diagram of alternator	1	07/12/2021		TLM2	CO3	R5	
42.	Regulation Methods–EMF,MMF,ZPF Methods	1	10/12/2021		TLM2	CO3	R5	
43.	Synchronizing to infinite bus bars	1	11/12/2021		TLM2	CO3	R5	
44.	**Tutorial-VI**	1	13/12/2021		TLM3			
45.	Two reaction theory	1	14/12/2021		TLM2	CO3	R5	
46.	Parallel operation of synchronous generators	1	17/12/2021		TLM2	CO3	R5	
47.	Synchronous Machine constants	1	18/12/2021		TLM2	CO3	R5	
48.	**Tutorial-VII**	1	20/12/2021		TLM3			
49.	Revision	1	21/12/2021		TLM2	CO3	R5	
50.	**Quiz-IV/ ASSIGNMENT-IV**	1	24/12/2021		TLM6			
No. of classes required to complete UNIT-IV		13			No. of classes taken:			

UNIT-V:SYNCHRONOUS MOTORS

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.	Constructional features, principle of operation	1	27/12/2021		TLM2	CO3	R5	
52.	Methods of starting	1	28/12/2021		TLM2	CO3	R5	
53.	Power developed, Effect of increased load with constant excitation	1	30/12/2021		TLM2	CO4	R5	
54.	Synchronous motor with different excitations	1	01/01/2022		TLM2	CO4	R5	

55.	**Tutorial-VIII**	1	03/01/2022		TLM3			
56.	Effect of changing excitation constant load&Torque equation	1	04/01/2022		TLM2	CO4	R5	
57.	V curve and inverted V curve – hunting	1	07/01/2022		TLM2	CO3	R5	
58.	**Tutorial-IX**	1	08/01/2022		TLM3			
59.	**Quiz-V/ ASSIGNMENT-V**	1	10/01/2022		TLM6			
60.	MID-II		17/01/2022					
61.	MID-II		18/01/2022					
62.	MID-II		21/01/2022					
63.	MID-II		22/01/2022					
No. of classes required to complete UNIT-V		9			No. of classes taken:			

CONTENT BEYOND SYLLABUS

S.No	Topic	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
1			11/01/2022		

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)		

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	1W
II Phase of Instructions	15-11-2021	15-01-2022	9W
II Mid Examinations	17-01-2022	22-01-2022	1W
Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

Part - C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment-1	1,2	A1=5
Assignment – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment – 3	3,4	A3=5
Assignment – 4	3	A4=5
Assignment – 5	3	A5=5
II-Mid Examination	3,4	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4	B=20
Cumulative Internal Examination : A+B	**1,2,3,4**	**A+B=40**
Semester End Examinations	**1,2,3,4**	**C=60**
Total Marks: A+B+C	**1,2,3,4**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3. Work effectively as individuals and as team members in multidisciplinary projects.

PEO4. Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAMME OUTCOMES (POs)

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

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

c: 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.

d: 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.

e: 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.

f: 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.

g: 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.

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

i: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in

multidisciplinary settings.

j: 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.

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

l: 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.

PSOs (Program specific Outcomes):

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power

PSO-b: Design and analyze electrical machines, modern drive and lighting systems

PSO-c: Specify, design, implement and test analog and embedded signal processing electronic systems

PSO-d: Design controllers for electrical and electronic systems to improve their performance.

K.NAGALINGA CHARY	K.NAGALINGA CHARY		Dr.J.SIVAVARA PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD

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

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr.G.NAGESWARA RAO
Course Name & Code : ELECTRICAL POWER TRANSMISSION & 17EE12
L-T-P Structure : 2-2-0 Credits : 3
Program/Sem/Sec : B.Tech., EEE., V-Sem., Sections- A A.Y : 2021-22

Pre-requisites : --NIL

Course Educational Objective: This course enables the student to

- Make familiar with the different modes of transmission of electrical energy from the places of production to consumer areas
- Appreciate the relative electrical and mechanical design procedures of the transmission system and insulators from the technical, economic and social point of view
- Understand the various factors influencing the performance of transmission lines and analyze their performance

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

CO 1	Differentiate various modes of power transfer and types of transmission systems
CO 2	Identify devices and materials used for the transmission of electricity
CO 3	Evaluate the Inductance and capacitance of single and double circuit transmission lines
CO 4	Analyze the effects of line charging current, corona, and electrostatic field of EHVAC Lines on transmission line performance
CO5	Understand the per-unit calculations

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 a	PSO b	PSO c	PSO d
CO1	3				2		1		1	1		2	3	3		1
CO2	2	2		1			2		1	1		2	3	1		2
CO3	2	2	2	2	2								2			1
CO4	3	2	2	2	3	1							3	3		1
CO5	2		3		2											

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

TEXT BOOKS

1. John J Grainger, William D Stevenson Jr, "Power System Analysis", TMH Company, 4th Edition. 2003.
2. J.B.Gupta, "A Course in Power System", S. K. Kataria & Sons publications, 11th Edition, 2011.

REFERENCES

1. Colin Bayliss and Brian Hardy, "Transmission And Distribution Electrical Engineering", Elsevier Publication, 4th Edition, 2012.
2. C.L.Wadhwa, "Electrical Power Systems" New age International (P) Limited, 7th Edition,2017.
3. P S R Murthy, "Electrical Power Systems", BS Publications, 2017.
4. Hadi Saadat, "Power System Analysis", McGRAW-HILL International Editions, 3rd Edition,2011.
5. D P Kothari and I J Nagrath, "Power System Engineering", McGraw-Hill Education, 2nd Edition,2008

Part - B
COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : ELECTRICAL DESIGN OF TRANSMISSION LINES

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.	Types of conductors	1	20-09-21		TLM1	
2.	Resistance for solid conductors –Skin & Proximity Effects	1	21-09-21		TLM1	
3.	Inductance of single phase line	1	22-09-21		TLM1	
4.	GMR & GMD	1	23-09-21		TLM1	
5.	Inductance of three phase line	1	25-09-21		TLM2	
6.	Inductance of three phase double circuit line	1	29-09-21		TLM2	
7.	Capacitance of single phase line, three phase, double circuit	1	30-09-21		TLM1	
8.	TUTORIAL-I	1	05-10-21		TLM3	
9.	Problems	1	06-10-21		TLM1	
No. of classes required to complete UNIT-I : 09					No. of classes taken:	

UNIT-II : PERFORMANCE OF TRANSMISSION LINES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	Classification of Transmission Lines	1	07-10-21		TLM1	
11.	Short Transmission Lines, medium	1	12-10-21		TLM1	
12.	Long Transmission Lines	1	19-10-21		TLM1	
13.	Incident, Reflected, Refracted Waves	1	21-10-21		TLM2	
14.	Equivalent T & Equivalent π Representation	1	23-10-21		TLM1	
15.	Ferranti Effect	1	26-10-21		TLM1	
16.	Active & Reactive powers	1	28-10-21		TLM1	
17.	TUTORIAL-II	1	30-10-21		TLM3	
18.	Problems	1	02-11-21		TLM1	
No. of classes required to complete UNIT-II : 09					No. of classes taken:	

UNIT-III : MECHANICAL DESIGN OF TRANSMISSION LINES & UG CABLES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Sag and Tension	1	03-11-21		TLM1	

	calculations					
20.	Effect of wind, temperature, ice	1	07-11-21		TLM1	
21.	Cable Construction-Types of insulating materials	1	16-11-21		TLM1	
22.	Calculations of Insulation resistance and Dielectric Stress	1	17-11-21		TLM1	
23.	Capacitance of Single core	1	18-11-21		TLM2	
24.	Grading of Cables	1	20-11-21		TLM2	
25.	TUTORIAL-III	1	23-11-21		TLM3	
26.	Problems	1	24-11-21		TLM1	
No. of classes required to complete UNIT-III : 08					No. of classes taken:	

UNIT-IV : OVERHEAD LINE INSULATORS & CORONA

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Types of Insulators, String efficiency	1	25-11-21		TLM2	
28.	calculation of string efficiency	1	27-11-21		TLM1	
29.	Capacitance grading and Static Shielding	1	30-11-21		TLM1	
30.	Corona	2	01-12-21 02-12-21		TLM2	
31.	Interference with communication lines	1	04-12-21		TLM1	
32.	Tutorial-IV	1	07-12-21		TLM3	
33.	Problems	1	08-12-21		TLM1	
No. of classes required to complete UNIT-IV : 08					No. of classes taken:	

UNIT-V: TRAVELLING WAVES AND PER-UNIT SYSTEM

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.	Transients in power systems	1	09-12-21		TLM1	
35.	Travelling waves on transmission lines	1	14-12-21		TLM1	
36.	Line terminate through R,L & C	2	15-12-21 16-12-21		TLM1	
37.	Line terminate through OC & SC	2	18-12-21 21-12-21		TLM1	
38.	Bewley lattice diagram	1	22-12-21 23-11-21		TLM2	
39.	Per Unit quantities and advantages	2	28-12-21 29-12-21		TLM2	
40.	single line or one line diagram	2	30-12-21		TLM2	

41.	TUTORIAL-V Problems	2	01-01-22		TLM1	
No. of classes required to complete UNIT-V : 13					No. of classes taken:	

CONTENT BEYOND SYLLABUS:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
1	Digital method of travelling wave analysis	04-01-22 05-01-22			TLM2

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 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1.	Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.
PEO2.	Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3.	Work effectively as individuals and as team members in multidisciplinary projects.
PEO4.	Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Dr.G.Nageswara Rao	**Dr.G.Nageswara Rao**	**Dr. P.SOBHARANI**	**Dr.J.S.V.PRASAD**
Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr.G.NAGESWARA RAO
Course Name & Code : ELECTRICAL POWER TRANSMISSION & 17EE12
L-T-P Structure : 2-2-0 Credits : 3
Program/Sem/Sec : B.Tech., EEE., V-Sem., Sections- B A.Y : 2021-22

Pre-requisites : --NIL

Course Educational Objective: This course enables the student to

- Make familiar with the different modes of transmission of electrical energy from the places of production to consumer areas
- Appreciate the relative electrical and mechanical design procedures of the transmission system and insulators from the technical, economic and social point of view
- Understand the various factors influencing the performance of transmission lines and analyze their performance

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

CO 1	Differentiate various modes of power transfer and types of transmission systems
CO 2	Identify devices and materials used for the transmission of electricity
CO 3	Evaluate the Inductance and capacitance of single and double circuit transmission lines
CO 4	Analyze the effects of line charging current, corona, and electrostatic field of EHVAC Lines on transmission line performance
CO5	Understand the per-unit calculations

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 a	PSO b	PSO c	PSO d
CO1	3				2		1		1	1		2	3	3		1
CO2	2	2		1			2		1	1		2	3	1		2
CO3	2	2	2	2	2								2			1
CO4	3	2	2	2	3	1							3	3		1
CO5	2		3		2											

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

TEXT BOOKS

3. John J Grainger, William D Stevenson Jr, "Power System Analysis", TMH Company, 4th Edition. 2003.
4. J.B.Gupta, "A Course in Power System", S. K. Kataria & Sons publications, 11th Edition, 2011.

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5. Colin Bayliss and Brian Hardy, "Transmission And Distribution Electrical Engineering", Elsevier Publication, 4th Edition, 2012.
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7. P S R Murthy, "Electrical Power Systems", BS Publications, 2017.
8. Hadi Saadat, "Power System Analysis", McGRAW-HILL International Editions, 3rd Edition,2011.
5. D P Kothari and I J Nagrath, "Power System Engineering", McGraw-Hill Education, 2nd Edition,2008

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

UNIT-I : ELECTRICAL DESIGN OF TRANSMISSION LINES

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.	Types of conductors	1	20-09-21		TLM1	
2.	Resistance for solid conductors –Skin & Proximity Effects	1	22-09-21		TLM1	
3.	Inductance of single phase line	1	23-09-21		TLM1	
4.	GMR & GMD	1	24-09-21		TLM1	
5.	Inductance of three phase line	1	28-09-21		TLM2	
6.	Inductance of three phase double circuit line	1	29-09-21		TLM2	
7.	Capacitance of single phase line, three phase, double circuit	1	30-09-21		TLM1	
8.	TUTORIAL-I	1	01-10-21		TLM3	
9.	Problems	1	04-10-21		TLM1	
No. of classes required to complete UNIT-I : 09					No. of classes taken:	

UNIT-II : PERFORMANCE OF TRANSMISSION LINES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	Classification of Transmission Lines	1	06-10-21		TLM1	
11.	Short Transmission Lines, medium	1	08-10-21		TLM1	
12.	Long Transmission Lines	1	11-10-21		TLM1	
13.	Incident, Reflected, Refracted Waves	1	18-10-21		TLM2	
14.	Equivalent T & Equivalent π Representation	1	21-10-21		TLM1	
15.	Ferranti Effect	2	22-10-21 25-10-21		TLM1	
16.	Active & Reactive powers	2	27-10-21 28-10-21		TLM1	
17.	TUTORIAL-II	1	29-10-21		TLM3	
18.	Problems	1	01-11-21		TLM1	
No. of classes required to complete UNIT-II : 11					No. of classes taken:	

UNIT-III : MECHANICAL DESIGN OF TRANSMISSION LINES & UG CABLES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Sag and Tension calculations	2	03-11-21 05-11-21		TLM1	
20.	Effect of wind, temperature, ice	2	08-11-21 10-11-21		TLM1	
21.	Cable Construction-Types of insulating materials	2	11-11-21 12-11-21		TLM1	
22.	Calculations of Insulation resistance and Dielectric Stress	1	15-11-21		TLM1	
23.	Capacitance of Single core	1	17-11-21		TLM2	
24.	Grading of Cables	2	18-11-21 19-11-21		TLM2	
25.	TUTORIAL-III	1	24-11-21		TLM3	
26.	Problems	1	25-11-21		TLM1	
No. of classes required to complete UNIT-III : 12					No. of classes taken:	

UNIT-IV : OVERHEAD LINE INSULATORS & CORONA

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Types of Insulators, String efficiency	1	26-11-21		TLM2	
28.	calculation of string efficiency	2	29-11-21 01-12-21		TLM1	
29.	Capacitance grading and Static Shielding	1	02-12-21		TLM1	
30.	Corona	2	03-12-21 06-12-21		TLM2	
31.	Interference with communication lines	2	08-12-21 09-12-21		TLM1	
32.	Tutorial-IV	2	10-12-21 13-11-21		TLM3	
33.	Problems	2	15-12-21 16-12-21		TLM1	
No. of classes required to complete UNIT-IV : 12					No. of classes taken:	

UNIT-V: TRAVELLING WAVES AND PER-UNIT SYSTEM

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.	Transients in power systems	2	17-12-21 20-01-22		TLM1	
35.	Travelling waves on transmission lines	2	22-01-22 23-01-22		TLM1	

36.	Line terminate through R,L & C	2	24-01-22 27-01-22		TLM1	
37.	Line terminate through OC & SC	2	29-01-22 30-01-22		TLM1	
38.	Bewley lattice diagram	1	31-01-22		TLM2	
39.	Per Unit quantities and advantages	2	03-01-22 05-01-22		TLM2	
40.	single line or one line diagram	2	06-01-22 07-01-22		TLM2	
41.	TUTORIAL-V Problems	2	10-01-22 12-01-22		TLM1	
No. of classes required to complete UNIT-V : 15					No. of classes taken:	

CONTENT BEYOND SYLLABUS:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
1	Digital method of travelling wave analysis	13-01-22 14-01-22			TLM2

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 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5

Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1.	Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.
PEO2.	Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.
PEO3.	Work effectively as individuals and as team members in multidisciplinary projects.
PEO4.	Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Dr.G.Nageswara Rao	**Dr.G.Nageswara Rao**	**Dr. P.SOBHARANI**	**Dr.J.S.V.PRASAD**
Course Instructor	Course Coordinator	Module Coordinator	HOD

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COURSE HANDOUT

PROGRAM : B.Tech., V-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : **17EE14 - RENEWABLE ENERGY TECHNOLOGIES**

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : Dr A.V.G.A.Marthanda

COURSE COORDINATOR : Dr A.V.G.A.Marthanda

Pre-requisites : Power Generation and Utilization

COURSE OUTCOMES (CO)

CO1	Compare the conventional and sustainable energy resources & their control methods
CO2	Illustrate the planning and operation of renewable energy systems.
CO3	Analyze various factors for the erection of the wind power plant.
CO4	Compare photovoltaic system, Fuel cell and thermo solar power
CO5	Illustrate micro plants and micro turbines design considerations.

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	PSO 4
CO1	3		2	1	1		1		1	1					3	
CO2	2		3	1	1		1		1	1					2	
CO3			3		1										3	
CO4			3		1										3	
CO5			3		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).

TEXT BOOKS:

1) Felix a. Farret, M. Godoy simoes. 'Integration of Alternative Sources of Energy", a John Wiley & sons, inc.. publication, Secorid Edition, 2017.
2) John Twidell and Tony Weir "Renewable Energy Resources" Taylor & Francis,Third Edition 2015

REFERENCES

1. D.O.hall and R.P. Overeed, "Biomass Renegerable Energy", John Wiley and Sons, Newyork, 1987.
2. Spera D.A,"Wind Turbine Technology" Fundamentalconcepts of wind ASME Press, NY, 1994. Handbook: "Batteries and Fuel cell" — Linden, Me.Graw Hill

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : ALTERNATIVE SOURCES OF ENERGY

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 Subject Course Outcomes Introduction to UNIT-I	1	20-9-21		TLM1	CO1	John Twidell	
2.	Renewable Sources of Energy	1	23-9-21		TLM1	CO1	John Twidell	
3.	Renewable Sources of Energy	1	25-9-21		TLM1	CO1	John Twidell	
4.	Renewable Energy versus Alternative Energy Planning and Development,	1	27-9-21		TLM1	CO1	John Twidell	
5.	, Renewable Energy Economics	1	30-9-21		TLM1	CO1	John Twidell	
6.	Modem Electronic Controls of Power Systems	1	02-10-21		TLM1	CO2	John Twidell	
7.	**WIND POWER PLANTS :** Introduction, Appropriate Location, Wind Power, and	1	04-10-21		TLM4 TLM5	CO2	John Twidell	
8.	General Classification of Wind Turbines, Generators Speed	1	07-10-21		TLM4 TLM5	CO2	John Twidell	
9.	Control Used in Wind Power Energy Analysis of Small Generating Systems	1	09-10-21		TLM4 TLM5	CO2	John Twidell	
10.	Speed Control Used in Wind Power Energy	1	11-10-21		TLM4 TLM5	CO2	John Twidell	
11.	Analysis of Small Generating Systems	1	14-10-21		TLM4 TLM5	CO2	John Twidell	
No. of classes required to complete UNIT-I: 9					No. of classes taken:			

UNIT – II: THERMOSOLAR POWER PLANTS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
12.	Water Heating by Solar Energy,	1	16-10-21		TLM1	CO1	John Twidell	
13.	Water Heating by Solar Energy	1	18-10-21		TLM1	CO1	John Twidell	
14.	Heat Transfer Calculation of Thermally Isolated Reservoirs	1	21-10-21		TLM1	CO1	John Twidell	
15.	Heat Transfer Calculation of Thermally Isolated Reservoirs	1	23-10-21		TLM1	CO1	John	
16.	Heating Domestic Water Thermo solar Energy	1	25-10-21		TLM1	CO1	John Twidell	
17.	Heating Domestic Water Thermo solar Energy	1	28-10-21		TLM1	CO1	John Twidell	
18.	Economical Analysis of Thermo solar Energy	1	30-10-21		TLM1	CO3		
19.	Economical Analysis of Thermo solar Energy	1	01-11-21		TLM1	CO3		
20.	revision	1	04-11-21					
No. of classes required to complete UNIT-II				No. of classes taken:				

UNIT-III : PHOTOVOLTAIC POWER PLANTS AND FUEL CELLS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
21.	Mid 1 exams **8/11/2021-14/11/2021**							
22.	Generation of Electricity by Photovoltaic Effect , ,	1	15/11/21		TLM1	CO3		
23.	Dependence of a PV Cell Characteristic on Temperature	1	18/11/21		TLM1 TLM8	CO4		
24.	, Solar Cell Output Characteristics, Photovoltaic Systems	1	20/11/21		TLM1	CO3		
25.	Solar Cell Output Characteristics, Photovoltaic Systems	1	22/11/21		TLM1	CO4		
26.	Applications of Photovoltaic Solar	1	25/11/21		TLM8	CO3		

	Energy The Fuel Cell, Constructional Features of Proton Exchange Membrane							
27.	Constructional Features of Proton Exchange Membrane	1	27/11/21		TLM1	CO4	John Twidell	
28.	Fue1 Cells and Solid Oxide Fuel Cells	1	29/11/21		TLM4 TLM5	CO2	John Twidell	
29.	Fue1 Cells and Solid Oxide Fuel Cells	1	02/12/21		TLM4 TLM5	CO2	John Twidell	
30.	Solid Oxide Fuel Cells	1	4/12/21					

No. of classes required to complete UNIT-III: **9**	No. of classes taken:

UNIT-IV : INTEGRATION OF RENEWABLE ENERGY SOURCES

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
31.	Introduction, Principles of Power Interconnection-,	1	6/12/21		TLM1	CO1		
32.	Introduction, Principles of Power Interconnection	1	9/12/21		TLM4 TLM5	CO2	John Twidell	
33.	Power Converters for Power Injection into the Grid	1	11/12/21					
34.	Instantaneous Active and Reactive Power Control Approach	1	13/12/21			CO1		
35.	Active and Reactive Power Control Approach	1	16/12/21		TLM1	CO1		
36.	Integration of Multiple Renewable Energy Sources		18/12/21		TLM4 TLM5	CO2	John Twidell	
37.	Integration of Multiple Renewable Energy Sources	1	20/12/21		TLM1	CO3		
38.	-. DC Link Integration, AC Link Integration	1	23/12/21		TLM1	CO1		
39.	-. DC Link Integration, AC	1	27-12-21		TLM1	CO2		

	Link Integration							
40.	-. DC Link Integration, AC Link Integration	1	30-12-21		TLM5	CO2		

No. of classes required to complete UNIT-IV : 06	No. of classes taken:

UNIT-V : MICROPLANTS AND MICROTURBINES

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.	Fuel from Biomass, Biomass for Biogas, Biological Formation of Biogas, ,	1	01-1-22		TLM1	CO1		
42.	Construction of Biodigester, & it's Characteristics	1	03-1-22		TLM1	CO1		
43.	Micro turbine Fuel, Control and Operation of Micro turbine	1	06-1-22		TLM1 TLM6	CO1		
44.	Control of Micro turbines, Storage Systems: Lead—Acid Batteries, Ultra capacitors,	1	08-1-22		TLM2	CO1		
45.	Flywheels, Superconducting Magnetic Storage System,	1	10-1-22		TLM2 TLM8	CO1		
46.	Geothermal Energy - Classification- Fundamentals of geophysics	1	10-1-22		TLM2	CO1		

No. of classes required to complete UNIT-V:	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
47.	Ultra capacitors	1	08-1-22		TLM2	CO1	1	

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : ALTERNATIVE SOURCES OF ENERGY

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 Subject Course Outcomes Introduction to UNIT-I	1	21-9-21		TLM1	CO1	John Twidell	
2.	Renewable Sources of Energy	1	22-9-21		TLM1	CO1	John Twidell	
3.	Renewable Sources of Energy	1	24-9-21		TLM1	CO1	John Twidell	
4.	Renewable Energy versus Alternative Energy Planning and Development,	1	28-9-21		TLM1	CO1	John Twidell	
5.	, Renewable Energy Economics	1	29-9-21		TLM1	CO1	John Twidell	
6.	Modem Electronic Controls of Power Systems	1	1-10-21		TLM1	CO2	John Twidell	
7.	**WIND POWER PLANTS :** Introduction, Appropriate Location, Wind Power, and	1	5-10-21		TLM4 TLM5	CO2	John Twidell	
8.	General Classification of Wind Turbines, Generators Speed	1	6-10-21		TLM4 TLM5	CO2	John Twidell	
9.	Control Used in Wind Power Energy Analysis of Small Generating Systems		8-10-21		TLM1	CO4	John Twidell	
10.	Speed Control Used in Wind Power Energy	1	12-10-21		TLM4 TLM5	CO2	John Twidell	
11.	Analysis of Small Generating Systems		13-10-21					
No. of classes required to complete UNIT-I:					No. of classes taken:			

UNIT-II : THERMOSOLAR POWER PLANTS

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.	Water Heating by Solar Energy,	1	15-10-21		TLM1	CO1	John Twidell	
2.	Water Heating by Solar Energy	1	19-10-21		TLM1	CO1	John Twidell	
3.	Heat Transfer Calculation of Thermally Isolated Reservoirs	1	20-10-21		TLM1	CO1	John Twidell	
4.	Heat Transfer Calculation of Thermally Isolated Reservoirs	1	22-10-21		TLM1	CO1	John	
5.	Heat Transfer Calculation of Thermally Isolated Reservoirs	1	26-10-21		TLM1	CO1	John	
6.	Heating Domestic Water Thermo solar Energy	1	27-10-21		TLM1	CO1	John Twidell	
7.	Heating Domestic Water Thermo solar Energy	1	29-10-21		TLM1	CO1	John Twidell	
8.	Economical Analysis of Thermo solar Energy	1	2-11-21		TLM1	CO3		
9.	Economical Analysis of Thermo solar Energy	1	3-11-21		TLM1	CO3		
10.	revision	1	5-11-21					

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

Mid 1 exams
8/11/2021-14/11/2021

UNIT-III : PHOTOVOLTAIC POWER PLANTS AND FUEL CELLS

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.								
2.	Generation of Electricity by Photovoltaic Effect , ,	1	16/11/21		TLM1	CO3		
3.	Dependence of a PV Cell Characteristic on Temperature	1	17/11/21		TLM1 TLM8	CO4		
4.	, Solar Cell Output Characteristics, Photovoltaic Systems	1	19/11/21		TLM1	CO3		
5.	Solar Cell Output	1	23/11/21		TLM1	CO4		

	Characteristics, Photovoltaic Systems							
6.	Applications of Photovoltaic Solar Energy The Fuel Cell, Constructional Features of Proton Exchange Membrane	1	24/11/21		TLM8	CO3		
7.	Constructional Features of Proton Exchange Membrane	1	26/11/21		TLM1	CO4	John Twidell	
8.	Fue1 Cells and Solid Oxide Fuel Cells	1	30/11/21		TLM1	CO4	John Twidell	
9.	Fue1 Cells and Solid Oxide Fuel Cells	1	1/12/21		TLM1	CO4	John Twidell	
10.	Solid Oxide Fuel Cells	1	3/12/21		TLM1	CO4	John Twidell	

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

UNIT-IV : INTEGRATION OF RENEWABLE ENERGY SOURCES

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, Principles of Power Interconnection-,	1	7/12/21		TLM1	CO1	John Twidell	
2.	Power Converters for Power Injection into the Grid	1	8/12/21		TLM1	CO1		
3.	Power Converters for Power Injection into the Grid	1	10/12/21		TLM1	CO1		
4.	Instantaneous Active and Reactive Power Control Approach	1	14/12/21		TLM1	CO1	John Twidell	
5.	Instantaneous Active and Reactive Power Control Approach	1	15/12/21		TLM1	CO1		
6.	Integration of Multiple Renewable Energy Sources	1	17/12/21		TLM1	CO3	John Twidell	
7.	Integration of Multiple Renewable Energy Sources	1	21/12/21		TLM1	CO1		
8.	DC Link Integration, AC Link Integration	1	22/12/21		TLM1	CO2	John Twidell	

9.	-DC Link Integration, AC Link Integration	1	24/12/21		TLM1	CO2	John Twidell	
10.	DC Link Integration, AC Link Integration	1	28/12/21		TLM5	CO2		
No. of classes required to complete UNIT-IV :				No. of classes taken:				

UNIT-V : MICROPLANTS AND MICROTURBINES

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.	Fuel from Biomass, Biomass for Biogas, Biological Formation of Biogas	1	29/12/21		TLM1	CO1	John Twidell	
2.	Construction of Biodigester, & it's Characteristics Micro turbine	1	31/12/21		TLM1	CO1	John Twidell	
3.	Fuel, Control and Operation of Micro turbine Control of Micro turbines,	1	4/1/22		TLM1	CO1	John Twidell	
4.	Storage Systems: Lead—Acid Batteries Ultra capacitors Flywheels,	1	5/1/22		TLM1 TLM6	CO1	John Twidell	
5.	Superconducting Magnetic Storage System Geothermal EnergyClassification-Fundamentals of geophysics	1	7/1/22		TLM2	CO1	John Twidell	
6.	Revision		11/1/22					
7.	, Revision	1	12/1/22					
8.	Revision		14/1/22					
No. of classes required to complete UNIT-V:				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
1.	Ultra capacitors	1	05-01-22		TLM2	CO1	1	

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	17-08-2020	03-10-2020	7W
I Mid Examinations	28-09-2020	03-10-2020	
II Phase of Instructions	05-10-2020	21-11-2020	7W
II Mid Examinations	16-11-2020	21-11-2020	
Preparation and Practical's	23-11-2020	28-11-2020	1W
Semester End Examinations	30-11-2020	14-12-2020	2W

EVALUATION PROCESS:

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

PEOs(Program Educational Objectives):

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher

education and research.

PEO3. Work effectively as individuals and as team members in multidisciplinary projects.

PEO4.Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

POs:(Program Outcomes)

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

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

c: 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.

d: 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.

e: 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.

f: 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.

g: 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.

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

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

j: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.

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

l: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.

PSOs(Program Specific Outcomes)

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power

PSO b: Design and analyze electrical machines, modern drive and lighting systems

PSO c: Specify, design, implement and test analog and embedded signal processing electronic systems

PSO d: Design controllers for electrical and electronic systems to improve their performance

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr.A.V.G.A.Marthanda	Dr A.V.G.A.Marthanda	Dr.M.S.Giridhar	Dr.J.S.V.Prasad

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr.M.S.Giridhar
Course Name & Code : Electrical Safety (17EE90) Credits : 3
L-T-P Structure : 3-0-0 A.Y : 2020-21
Program/Sem/Sec : B.Tech., EEE., V-Sem., Sections- A

PRE-REQUISITE: None

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to

- A comprehensive exposure to electrical hazards
- Various grounding techniques of electrical equipments
- Safety procedures and various electrical maintenance techniques
- Reviews the IE rules in implementing the electrical safety procedures

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

CO 1	Describe the electrical hazards and safety equipment.
CO 2	Analyze various grounding and bonding techniques.
CO 3	Carry out proper maintenance of electrical equipment on various standards.
CO 4	Outline the IE rules and acts in electrical safety.

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2		2			1	3					2	2			
CO2	3	2	2	1	2							1	3	2		
CO3	2	2	2	1	3	2	1									
CO4	2			1		**2**							3	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).

TEXT BOOKS:

T1 John Cadick, Mary Capelli-Schellpfeffer, Dennis Neitzel, Al Winfield, 'Electrical Safety Handbook', McGraw Hill Education, 4th Edition, 2012.

T2 Indian Electricity Act and Rules, Government of India, 2003.

REFERENCE BOOKS:

R1 Maxwell Adams.J, 'Electrical Safety – a guide to the causes and prevention of electrical hazards', The Institute of Electrical Engineers, IET 1994.

R2 Ray A.Jones, Jane G. Jones, Electrical safety in the workplace, Jones & Bartlett Learning, 2000.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Electrical Hazards and Electrical Safety Equipments

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.	Primary and secondary hazards	1	21.09.2021		TLM1	
2.	arc, blast, shocks-causes	1	22.09.2021		TLM1	
3.	arc, blast, shocks-effects	1	25.09.2021		TLM1	
4.	safety equipment – flash and thermal protection	1	28.09.2021		TLM1	
5.	safety equipment –head and eye protection	1	29.09.2021		TLM1	
6.	rubber insulating equipment, hot sticks, insulated tools, barriers and signs, safety tags, locking devices	2	02.10.2021 05.10.2021		TLM1	
7.	voltage measuring instruments	1	06.10.2021		TLM1	
8.	proximity and contact testers	1	09.10.2021		TLM1	
9.	safety electrical one line diagram	1	12.10.2021		TLM1	
10.	electrician's safety kit.	1	13.10.2021		TLM1	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

UNIT-II: Grounding of Electrical Systems

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.	General requirements of grounding and bonding – definitions	2	16.10.2021 19.10.2021		TLM1	
2.	Grounding of electrical equipment bonding of electrically conducting materials and other equipment	2	20.10.2021 23.10.2021		TLM1	
3.	connection of grounding and bonding equipment	1	26.10.2021		TLM1	
4.	System grounding – purpose of system grounding	1	27.10.2021		TLM1	
5.	Grounding electrode system	1	30.10.2021		TLM1	
6.	Grounding conductor connection to electrodes	1	24.11.2021		TLM1	
7.	use of grounded circuit conductor for grounding equipment	1	02.11.2021		TLM1	
8.	Grounding of low voltage and high voltage systems.	1	03.11.2021		TLM1	
No. of classes required to complete UNIT-II: 08				No. of classes taken:		

UNIT-III: Safety Procedures and Methods

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.	The six Steps safety methods –	2	06.11.2021		TLM1	

	pre job briefings		09.11.2021			
2.	Hot work decision tree	2	10.11.2021 13.11.2021		TLM1	
3.	Safe switching of power system	1	16.11.2021		TLM1	
4.	Lock out – tag out – flash hazard calculation and approach distances	1	17.11.2021		TLM1	
5.	Calculating the required level of arc protection	1	20.11.2021		TLM1	
6.	Safety equipment, procedure for low voltage and high voltage systems	1	23.11.2021		TLM1	
7.	The one minute safety audit.	1	24.11.2021		TLM1	
No. of classes required to complete UNIT-III:07				No. of classes taken:		

UNIT-IV: Electrical Maintenance and its Relationship to Safety

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.	Safety related case for electrical maintenance	1	27.11.2021		TLM1	
2.	Reliability centered maintenance (RCM)	1	30.11.2022		TLM1	
3.	Eight step maintenance programme	2	01.12.2021 04.12.2021		TLM1	
4.	Frequency of maintenance	1	07.12.2021		TLM1	
5.	Maintenance equipment for specific equipment and location	2	08.12.2021 11.12.2021		TLM1	
6.	Regulatory bodies	1	14.12.2021		TLM1	
7.	National electrical safety code	1	15.12.2021		TLM1	
8.	Standard for electrical safety in work place	1	18.12.2021		TLM1	
9.	Occupational safety and health administration standards.	1	21.12.2021		TLM1	
No. of classes required to complete UNIT-IV: 09				No. of classes taken:		

UNIT-V: Review of IE Rules and ACTs and their significance

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.	Objective and scope – ground clearances and section clearances	2	22.12.2021 28.12.2021		TLM1	
2.	Standards of electrical safety	2	29.12.2021 01.01.2022		TLM1	
3.	Safe limitations of current, voltage	2	04.01.2022 05.01.2022		TLM1	
4.	Earthing of system neutral	2	08.01.2022 11.01.2022		TLM1	

5.	Rules regarding first aid and fire fighting facility.	1	12.01.2022		TLM1	
6.	Indian Electricity Acts related to Electrical Safety.	1	15.01.2022		TLM1	
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 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
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	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO 2	Design and analyze electrical machines, modern drive and lighting systems
PSO 3	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO 4	Design controllers for electrical and electronic systems to improve their performance

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Name)	(Name)	(Name)	(Name)

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr.M.S.Giridhar
Course Name & Code : Electrical Safety (17EE90) Credits : 3
L-T-P Structure : 3-0-0 A.Y : 2020-21
Program/Sem/Sec : B.Tech., EEE., V-Sem., Sections- B

PRE-REQUISITE: None

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to

- A comprehensive exposure to electrical hazards
- Various grounding techniques of electrical equipments
- Safety procedures and various electrical maintenance techniques
- Reviews the IE rules in implementing the electrical safety procedures

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

CO 1	Describe the electrical hazards and safety equipment.
CO 2	Analyze various grounding and bonding techniques.
CO 3	Carry out proper maintenance of electrical equipment on various standards.
CO 4	Outline the IE rules and acts in electrical safety.

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	2		2			1	3					2	2			
CO2	3	2	2	1	2							1	3	2		
CO3	2	2	2	1	3	2	1									
CO4	2			1		**2**							3	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).

TEXT BOOKS:

T1 John Cadick, Mary Capelli-Schellpfeffer, Dennis Neitzel, Al Winfield, 'Electrical Safety Handbook', McGraw Hill Education, 4th Edition, 2012.

T2 Indian Electricity Act and Rules, Government of India, 2003.

REFERENCE BOOKS:

R1 Maxwell Adams.J, 'Electrical Safety – a guide to the causes and prevention of electrical hazards', The Institute of Electrical Engineers, IET 1994.

R2 Ray A.Jones, Jane G. Jones, Electrical safety in the workplace, Jones & Bartlett Learning, 2000.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Electrical Hazards and Electrical Safety Equipments

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.	Primary and secondary hazards	1	22.09.2021		TLM1	
2.	arc, blast, shocks-causes	1	24.09.2021		TLM1	
3.	arc, blast, shocks-effects	1	25.09.2021		TLM1	
4.	safety equipment – flash and thermal protection	1	29.09.2021		TLM1	
5.	safety equipment –head and eye protection	1	01.10.2021		TLM1	
6.	rubber insulating equipment, hot sticks, insulated tools, barriers and signs, safety tags, locking devices	1	02.10.2021		TLM1	
7.	voltage measuring instruments	1	06.10.2021		TLM1	
8.	proximity and contact testers	1	08.10.2021		TLM1	
9.	safety electrical one line diagram	1	09.10.2021		TLM1	
10.	electrician's safety kit.	1	13.10.2021		TLM1	
11.	Revision of Unit-I	1	15.10.2021		TLM1	
No. of classes required to complete UNIT-I: 11				No. of classes taken:		

UNIT-II: Grounding of Electrical Systems

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.	General requirements of grounding and bonding – definitions	2	20.10.2021 22.10.2021		TLM1	
2.	Grounding of electrical equipment bonding of electrically conducting materials and other equipment	2	23.10.2021 27.10.2021		TLM1	
3.	connection of grounding and bonding equipment	1	29.10.2021		TLM1	
4.	System grounding – purpose of system grounding	1	30.10.2021		TLM1	
5.	Grounding electrode system	1	03.11.2021		TLM1	
6.	Grounding conductor connection to electrodes	1	05.11.2021		TLM1	
7.	use of grounded circuit conductor for grounding equipment	1	06.11.2021		TLM1	
8.	Grounding of low voltage and high voltage systems.	1	17.11.2021		TLM1	
No. of classes required to complete UNIT-II: 09				No. of classes taken:		

UNIT-III: Safety Procedures and Methods

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.	The six Steps safety methods – pre job briefings	2	19.11.2021 20.11.2021		TLM1	
2.	Hot work decision tree	2	24.11.2021 26.11.2021		TLM1	
3.	Safe switching of power system	1	27.11.2021		TLM1	
4.	Lock out – tag out – flash hazard calculation and approach distances	1	01.12.2021		TLM1	
5.	Calculating the required level of arc protection	1	03.12.2021		TLM1	
6.	Safety equipment, procedure for low voltage and high voltage systems	1	04.12.2021		TLM1	
7.	The one minute safety audit.	1	08.12.2021		TLM1	
No. of classes required to complete UNIT-III:07				No. of classes taken:		

UNIT-IV: Electrical Maintenance and its Relationship to Safety

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.	Safety related case for electrical maintenance	2	10.12.2021 11.12.2021		TLM1	
2.	Reliability centered maintenance (RCM)	1	15.12.2021		TLM1	
3.	Eight step maintenance programme	2	17.12.2021 18.12.2021		TLM1	
4.	Frequency of maintenance	1	22.12.2021		TLM1	
5.	Maintenance equipment for specific equipment and location	2	24.12.2021 29.12.2021		TLM1	
6.	Regulatory bodies	1	31.12.2021		TLM1	
7.	National electrical safety code	1	01.01.2022		TLM1	
8.	Standard for electrical safety in work place	1	05.01.2022		TLM1	
9.	Occupational safety and health administration standards.	1	07.01.2022		TLM1	
No. of classes required to complete UNIT-IV: 09				No. of classes taken:		

UNIT-V: Review of IE Rules and ACTs and their significance

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.	Objective and scope – ground clearances a Objective and scope – ground clearances and section clearances nd section clearances	2	08.01.2022 12.01.2022		TLM1	
2.	Standards of electrical safety	1	14.01.2022		TLM1	
3.	safe limitations of current,	1	15.01.2022		TLM1	

	voltage					
4.	Earthing of system neutral	1	19.01.2022		TLM1	
5.	Rules regarding first aid and fire fighting facility.	1	21.01.2022		TLM1	
6.	Indian Electricity Acts related to Electrical Safety.	1	22.01.2022		TLM1	
No. of classes required to complete UNIT-V: 08				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 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
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	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO 2	Design and analyze electrical machines, modern drive and lighting systems
PSO 3	Specify, design, implement and test analog and embedded signal processing electronic systems
PSO 4	Design controllers for electrical and electronic systems to improve their performance

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Name)	(Name)	(Name)	(Name)

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ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. Pawel Veliventi
Course Name & Code : Presentation Skills Lab; 17FE61
L-T-P Structure : 0-0-2+2 Credit : 1
Program/Sem/Sec : B.Tech.,EEE , V-Sem., Section- A A.Y: 2021-22

PRE-REQUISITE: Should have fundamental knowledge in making conversations in English and be with readiness to speak

COURSE EDUCATIONAL OBJECTIVE (CEOs): To help students make oral presentations, power point presentations, participate in group discussions and write project/research/technical reports/formal letters by gathering information and organizing ideas relevantly and coherently.

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

CO 1	Make power point presentations and oral presentations
CO 2	Use standard vocabulary contextually.
CO 3	Manage skillfully through group discussions.
CO 4	Negotiate skillfully for better placement.

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

Course		**Program Outcomes (POs)**											
	POs→	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Presentation Skills Lab 17FE61	**CO1**		1		3		2			3	3		2
	CO2		1		3		2			3	3		2
	CO3		1		3		2			3	3		2
	CO4		1		3		2			3	3		2

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

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):

BATCH-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	20-09-2021		TLM4	CO1	
2.	JAM- I (prepared)	2	27-09-2021		TLM4	CO1	
3.	JAM-II (Extempore)	2	04-10-2021		TLM4	CO1	
4.	Group Discussion	2	11-10-2021		TLM4, TLM6	CO3	
5.	Group Discussion	2	18-10-2021		TLM4, TLM6	CO3	
6.	Reading Comprehension/Listening Comprehension	2	25-10-2021		TLM3	CO2	
7.	Poster Presentation	2	01-11-2021		TLM2, TLM4	CO1	
8.	Power point Presentation	2	15-11-2021		TLM2, TLM4	CO1	
9.	Vocabulary(one-word substitutes/analogy/idioms)	2	22-11-2021		TLM1, TLM3	CO2	
10.	Vocabulary(one-word substitutes/analogy/idioms)	2	29-11-2021		TLM1, TLM3	CO2	
11.	Letter & Résumé writing	2	06-12-2021		TLM1, TLM3	CO4	
12.	Letter & Résumé writing	2	13-12-2021		TLM1, TLM3	CO4	
13.	Vocabulary(Synonyms/Antonyms)	2	20-12-2021		TLM1, TLM3	CO2	
14.	Mock Interviews	2	27-12-2021			CO4	
15.	Mock Interviews	2	03-01-2022			CO4	
16.	Internal Lab Exam	2	10-01-2022				
	Total	**32**					

BATCH-B

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	24-09-2021		TLM4	CO1	
2.	JAM- I (prepared)	2	01-10-2021		TLM4	CO1	
3.	JAM-II (Extempore)	2	08-10-2021		TLM4	CO1	
4.	Group Discussion	2	22-10-2021		TLM4, TLM6	CO3	
5.	Group Discussion	2	29-10-2021		TLM4, TLM6	CO3	
6.	Reading Comprehension/Listening Comprehension	2	5-11-2021		TLM3	CO2	
7.	Poster Presentation	2	19-11-2021		TLM2, TLM4	CO1	
8.	Power point Presentation	2	26-11-2021		TLM2, TLM4	CO1	
9.	Vocabulary(one-word substitutes/analogy/idioms)	2	03-12-2021		TLM1, TLM3	CO2	
10.	Letter & Résumé writing	2	10-12-2021		TLM1, TLM3 TLM6	CO4	
11.	Vocabulary(Synonyms/Antonyms)	2	17-12-2021		TLM1, TLM3	CO2	
12.	Mock Interviews	2	24-12-2021			CO4	
13.	Mock Interviews	2	31-12-2021			CO4	
14.	Internal Lab Exam	2	07-01-2022				
	Total	**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 R17 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**

(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:

Sl.No.	Topic	Marks
i.	Synonyms	5
ii.	Antonyms	5
iii	One-Word substitutes	5
iv	Idioms	2 ½
v	Analogy	2 ½
I.	Resum`e	5
II.	Reading Comprehension	5
III.	Oral & written task (JAM/GD/PPT)	20
IV.	Interview	10
	Total	**60**

% 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

Rubrics For Evaluation of Laboratory Courses								
Day-To-Day Lab (Observation) Performance Evaluati 17)					Record Performance Evaluation (R-17)			
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 up to the mark **(3 Marks)**	All the points are analyzed properly More content was delivered. **(4 Marks)**	Content **(4 Marks)**	Very less points were written Points were not analyzed properly **(2 Marks)**	Some of the points were missing Some points are not properly analyzed **(3 Marks)**	Complete information is provided for the topic Important information is provided with illustrations/ examples **(4 Marks)**
3	Style of Presentation **(2 Marks)**	Inappropriate body language Improper presentation **(0 Marks)**	Presentation is not up to the mark **(1 Mark)**	Presented well with appropriate etiquette 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) (1Mark)**	No grammar/ spelling corrections are found and well-written **(2 Marks)**

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
Dr. Pawel Veliventi	Dr.B. Samrajya Lakshmi	Dr.B. Samrajya Lakshmi	Dr.A. Rami Reddy

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

ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. B SAGAR
Course Name & Code : Presentation Skills Lab; 17FE61
L-T-P Structure : 0-0-2+2 Credit : 1
Program/Sem/Sec : B.Tech.,EEE , V-Sem., Sections- B A.Y: 2021-22

PRE-REQUISITE: Should have fundamental knowledge in making conversations in English and be with readiness to speak

COURSE EDUCATIONAL OBJECTIVE (CEOs): To help students make oral presentations, power point presentations, participate in group discussions and write project/research/technical reports/formal letters by gathering information and organizing ideas relevantly and coherently.

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

CO 1	Make power point presentations and oral presentations
CO 2	Use standard vocabulary contextually.
CO 3	Manage skillfully through group discussions.
CO 4	Negotiate skillfully for better placement.

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

Course		**Program Outcomes (POs)**											
	POs→	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Presentation Skills Lab 17FE61	**CO1**		1		3		2			3	3		2
	CO2		1		3		2			3	3		2
	CO3		1		3		2			3	3		2
	CO4		1		3		2			3	3		2

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

COURSE DELIVERY PLAN (LESSON PLAN):

BATCH-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	21-09-2021		TLM4	CO1	
2.	JAM- I (prepared)	2	28-09-2021		TLM4	CO1	
3.	JAM-II (Extempore)	2	05-10-2021		TLM4	CO1	
4.	Group Discussion	2	12-10-2021		TLM4, TLM6	CO3	
5.	Group Discussion	2	19-10-2021		TLM4, TLM6	CO3	
6.	Reading Comprehension/Listening Comprehension	2	26-10-2021		TLM3	CO2	
7.	Poster Presentation	2	02-11-2021		TLM2, TLM4	CO1	
8.	Power point Presentation	2	16-11-2021		TLM2, TLM4	CO1	
9.	Vocabulary(one-word substitutes/analogy/idioms)	2	23-11-2021		TLM1, TLM3	CO2	
10.	Vocabulary(one-word substitutes/analogy/idioms)	2	30-11-2021		TLM1, TLM3	CO2	
11.	Letter & Résumé writing	2	07-12-2021		TLM1, TLM3	CO4	
12.	Letter & Résumé writing	2	14-12-2021		TLM1, TLM3	CO4	
13.	Vocabulary(Synonyms/Antonyms)	2	21-12-2021		TLM1, TLM3	CO2	
14.	Mock Interviews	2	28-12-2021			CO4	
15.	Mock Interviews	2	04-01-2022			CO4	
16.	Internal Lab Exam	2	11-01-2022				
	Total	**32**					

BATCH-B

S.No.	Activity	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
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7.	Poster Presentation	2	25-11-2021		TLM2, TLM4	CO1	
8.	Power point Presentation	2	02-12-2021		TLM2, TLM4	CO1	
9.	Vocabulary(one-word substitutes/analogy/idioms)	2	09-12-2021		TLM1, TLM3	CO2	
10.	Letter & Résumé writing	2	16-12-2021		TLM1, TLM3 TLM6	CO4	
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12.	Mock Interviews	2	30-12-2021			CO4	
13.	Mock Interviews	2	06-01-2022			CO4	
14.	Internal Lab Exam	2	13-01-2022				
	Total	**26**					

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:

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(a) Continuous Internal Evaluation (CIE):

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% of Attendance	**Marks**
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Rubrics For Evaluation of Laboratory Courses								
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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.
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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.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr.B Sagar	Dr.B. Samrajya Lakshmi	Dr.B. Samrajya Lakshmi	Dr.A. Rami Reddy

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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NAAC Accredited with 'B++' 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., V-Sem., EEE

ACADEMIC YEAR **:** 2021-22

COURSE NAME & CODE **:** Electrical Machines –I LAB - 17EE66

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

COURSE CREDITS **:** 1

COURSE INSTRUCTOR **: Mr.K.Nagalinga Chary,Mrs.K.S.L.Lavanya& Mr.Syed Abdul Mujeer**

COURSE COORDINATOR : Mr.K.Nagalinga Chary

Prerequisite: Electrical Machines-I (17EE09)

COURSE EDUCATIONAL OBJECTIVES (CEOs):

This course enables the student to

- Analyze the operation of dc machines and transformers
- Give practical exposure on the performance of DC machines and transformers

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

CO1 : Analyze the performance of 1-phase transformers
CO2 : Conduct various tests on dc shunt motors
CO3 : Analyze the performance of dc generator
CO4 : Develop report writing skills

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSOa	PSOb	PSOc	PSOd
CO1	3	3		3	2							1	3	3		2
CO2	3	3	3	3	2							1	3	3		2
CO3	3	3		3	2							1	3	3		2
CO4								**3**	**2**	**3**		**2**				

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

LIST OF EXPERIMENTS

S.NoName of the Experiment

1. Predetermination of Efficiency & Regulation of 1-phase transformer
2. Predetermination of Efficiency & Regulation of two identical 1-phase transformer
3. Determinationof Efficiency & Regulation of 1-phase Transformer by direct test
4. Conversion of Three phase to two phase by using two identical transformers
5. Determination of critical resistance and critical speed of D.C. shunt generator
6. Predetermination of Efficiency of D.C. shunt machine & Speed control of D.C. shunt motor
7. Performance characteristics of D.C. shunt motor
8. Determination of efficiency of DC shunt machine by conducting back to back test
9. Separation of stray losses in a D.C. shunt motor.
10. Calculation of voltage regulation for a 1-phase transformer using lab-view

Additional Experiments

11. Load characteristics of a separately excited D.C. Generator
12. Determination of Stray losses in a DC Shunt Motor by Retardation test

Part - B
COURSE DELIVERY PLAN (LESSON PLAN)
SECTION-A SCHEDULE

DAY : TUESDAY

Batches :

H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week	XV Week	XVI Week
Tentative date	21/09	28/09	05/10	12/10	19/10	26/10	02/11	16/11	23/11	30/11	07/12	14/12	21/12	28/12	04/01	11/01
Actual date																
18761A0258 18761A0294 19761A0201 19761A0202	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
19761A0203 19761A0204 19761A0205 19761A0206	DEMO	2	3	4	5	6	7	8	9	10	1					
19761A0207 19761A0209 19761A0211	DEMO	3	4	5	6	7	8	9	10	1	2					
19761A0212 19761A0213 19761A0214	DEMO	4	5	6	7	8	9	10	1	2	3					
19761A0215 19761A0216 19761A0218	DEMO	5	6	7	8	9	10	1	2	3	4					
19761A0219 19761A0220 19761A0221	DEMO	6	7	8	9	10	1	2	3	4	5					
19761A0223 19761A0224 19761A0225	DEMO	7	8	9	10	1	2	3	4	5	6					
19761A0226 19761A0227 19761A0228	DEMO	8	9	10	1	2	3	4	5	6	7					
19761A0229 19761A0230 19761A0231	DEMO	9	10	1	2	3	4	5	6	7	8					
19761A0232 19761A0233 19761A0234	DEMO	10	1	2	3	4	5	6	7	8	9					

DAY : THURSDAY

Batches :

H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week
Tentative date	23/09	30/09	07/10	21/10	28/10	18/11	25/11	02/12	09/12	16/12	23/12	30/12	06/01
Actual date													
19761A0235 19761A0236 19761A0237 19761A0238	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	INTERNAL EXAM
19761A0239 19761A0240 19761A0241	DEMO	2	3	4	5	6	7	8	9	10	1		
19761A0242 19761A0243 19761A0244	DEMO	3	4	5	6	7	8	9	10	1	2		
19761A0245 19761A0246 19761A0247	DEMO	4	5	6	7	8	9	10	1	2	3		
19761A0248 19761A0249 19761A0250	DEMO	5	6	7	8	9	10	1	2	3	4		
19761A0251 19761A0252 19761A0253	DEMO	6	7	8	9	10	1	2	3	4	5		
19761A0254 20765A0201 20765A0202	DEMO	7	8	9	10	1	2	3	4	5	6		
20765A0203 20765A0204 20765A0205	DEMO	8	9	10	1	2	3	4	5	6	7		
20765A0206 20765A0207 20765A0208	DEMO	9	10	1	2	3	4	5	6	7	8		
20765A0209 20765A0210 20765A0211	DEMO	10	1	2	3	4	5	6	7	8	9		

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)		

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	1W
II Phase of Instructions	15-11-2021	15-01-2022	9W
II Mid Examinations	17-01-2022	22-01-2022	1W
Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

Part - C

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3. Work effectively as individuals and as team members in multidisciplinary projects.

PEO4. Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAMME OUTCOMES (POs)

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

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

c: 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.

d: 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.

e: 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.

f: 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.

g: 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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l: 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.

PSOs (Program specific Outcomes):

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power

PSO-b: Design and analyze electrical machines, modern drive and lighting systems

PSO-c: Specify, design, implement and test analog and embedded signal processing electronic systems

PSO-d: Design controllers for electrical and electronic systems to improve their performance.

K. NAGALINGA CHARY Mrs.K.S.L.LAVANYA Mr.SD.ABDUL MUJEER	K.NAGALINGA CHARY		Dr.J.SIVAVARA PRASAD
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

Part - A

PROGRAM : B.Tech., V-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : Electrical Machines –I LAB - 17EE66

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

COURSE CREDITS : 1

COURSE INSTRUCTOR : **Mr.K.Nagalinga Chary&Mrs.K.S.L.Lavanya**

COURSE COORDINATOR : **Mr.K.Nagalinga Chary**

Prerequisite: Electrical Machines-I (17EE09)

COURSE EDUCATIONAL OBJECTIVES (CEOs):

This course enables the student to

- Analyze the operation of dc machines and transformers
- Give practical exposure on the performance of DC machines and transformers

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

CO1: Develop the Equivalent circuit of Transformer.

CO2: Analyze the performance of DC machines and Transformers.

CO3: Control the speed of a DC Motor.

CO4: Identify a suitable machine for real time application.

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	2			2	3	3		1			3
CO2	3	3		2	2			2	3	3		1			3
CO3	3				3			2	3	3		1			3

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

LIST OF EXPERIMENTS

S.NoName of the Experiment

1. Predetermination of Efficiency & Regulation of 1-phase transformer
2. Predetermination of Efficiency & Regulation of two identical 1-phase transformer
3. Determinationof Efficiency & Regulation of 1-phase Transformer by direct test
4. Conversion of Three phase to two phase by using two identical transformers
5. Determination of critical resistance and critical speed of D.C. shunt generator
6. Predetermination of Efficiency of D.C. shunt machine & Speed control of D.C. shunt motor
7. Performance characteristics of D.C. shunt motor
8. Determination of efficiency of DC shunt machine by conducting back to back test
9. Separation of stray losses in a D.C. shunt motor.
10. Calculation of voltage regulation for a 1-phase transformer using lab-view

Additional Experiments

11. Load characteristics of a separately excited D.C. Generator
12. Determination of Stray losses in a DC Shunt Motor by Retardation test

Part - B

COURSE DELIVERY PLAN (LESSON PLAN)

SECTION-A SCHEDULE

DAY : WEDNESDAY
Batches :

H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week	XV
Tentative date	22/9/21	29/9/21	6/10/21	20/10/21	27/10/21	3/11/21	17/11/21	24/11/21	1/12/21	8/12/21	15/12/21	22/12/21	29/12/21	5/1/22	12/1/22
Actual date															
Section-A (18761A0283 19761A0255 to 19761A0260 to 18761A0262 to 19761A0287)	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
	DEMO	1	2	3	4	5	6	7	8	9	10				
	DEMO	1	2	3	4	5	6	7	8	9	10				
	DEMO	1	2	3	4	5	6	7	8	9	10				
	DEMO	1	2	3	4	5	6	7	8	9	10				
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	DEMO	1	2	3	4	5	6	7	8	9	10				
	DEMO	1	2	3	4	5	6	7	8	9	10				

DAY :SATURDAY
Batches :

H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII
Tentative date	25/9/21	9/10/21	23/10/21	30/10/21	20/11/21	27/11/21	27/12/21	04/12/21	04/12/21	11/1/21	11/1/21	18/12/21	08/1/22
Actual date													
Section-A (19761A0288 to 19761A0296 19761A0298 to 19761A02A9 and 20765A0212 to 20765A0222)	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
	DEMO	1	2	3	4	5	6	7	8	9	10		
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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)		

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	1W
II Phase of Instructions	15-11-2021	15-01-2022	8W
II Mid Examinations	17-01-2022	22-01-2022	1W
Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

Part - C

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

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PSO-c: Specify, design, implement and test analog and embedded signal processing electronic systems

PSO-d: Design controllers for electrical and electronic systems to improve their performance.

Mrs.K.S.L.LAVANYA K.NAGALINGA CHARY	K.NAGALINGA CHARY	Mr.P.DEEPAK REDDY	Dr.SIVAVARA PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD

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COURSE HANDOUT

PART - A

PROGRAM : B.Tech., V-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : **ELECTRONIC CIRCUITS AND IC'S LAB** -(17EE67)

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

COURSE CREDITS : 1

Prerequisite: Electronic Circuits and Devices(17EE01), Digital Logic Circuit Design(17EE04)

COURSE EDUCATIONAL OBJECTIVES (CEOs):

This course enables the student to
- Familiar design concepts of different linear and digital ICs
- Gain practical exposure on different electronic circuits and ICs

Course Outcomes: At the end of the course, the student will be able to:
CO1: Analyze Op-Amp circuits.
CO2: Design filter circuits using Op-amp
CO3: Synthesize Oscillators using Op-amp
CO4: Design multi vibrators and Voltage regulators.

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

PO	a	b	c	d	e	f	g	h	i	j	k	l	PSOa	PSOb	PSOc	PSOd
CO1	2	1	2	2					3	3		1			2	2
CO2	2	1	2	2					3	3		1			2	2
CO3	2	2		1					3	3		1	3		2	2
CO4	2	1	2	2					3	3		1			2	2

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

LIST OF EXPERIMENTS

CYCLE-I

1. Realisation of adder, subtractor, comparator circuits using op-Amp.
2. Design of LPF, HPF (first order) using Op-Amp.
3. Design of Differentiator and Integrator using Op-Amp.
4. Realization of RC phase shift oscillator using Op-Amp.
5. Realization of Wien bridge oscillator using Op-Amp.

CYCLE-II

6. Design Monostable and Astable multivibrator circuits using IC 555 timer.
7. Design of Voltage regulator using IC 723.
8. PLL characteristics and frequency multiplier using PLL IC 565.
9. Implementation of 3-bit DAC using Op-Amp.
10. Design Voltage controlled oscillator using IC 566.

ADDITIONAL EXPERIMENTS

11. Voltage regulator using LM723
12. Design of Schmitt trigger.

PART - B

COURSE DELIVERY PLAN (LESSON PLAN)

SECTION-B SCHEDULE

DAY : TUESDAY

Batches :

H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week	XV
Tentative date	21/9/21	28/9/21	5/10/21	19/10/21	26/10/21	2/11/21	16/11/21	23/11/21	30/12/21	7/12/21	14/12/21	21/12/21	28/12/21	4/1/22	11/1/22
Actual date															
Section-A BATCH-1	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
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	DEMO	1	2	3	4	5	6	7	8	9	10				
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	DEMO	1	2	3	4	5	6	7	8	9	10				
	DEMO	1	2	3	4	5	6	7	8	9	10				

DAY :THURSDAY

Batches :

H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII
Tentative date	23/9/21	7/10/21	21/10/21	28/10/21	18/11/21	25/11/21	25/12/21	02/12/21	02/12/21	09/12/21	09/12/21	16/12/21	06/1/22
Actual date													
Section-A BATCH-2	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
	DEMO	1	2	3	4	5	6	7	8	9	10		
	DEMO	1	2	3	4	5	6	7	8	9	10		
	DEMO	1	2	3	4	5	6	7	8	9	10		
	DEMO	1	2	3	4	5	6	7	8	9	10		
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ACADEMIC CALENDAR:

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Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

PART – C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
DAY-TO-DAY MARKS(A)	10
RECORD MARKS (B)	10
INTERNAL EXAM (C)	10
VIVA-VOCE (D)	05
ATTENDANCE (E)	05
Cumulative Internal Examination (CIE) : A+B+C+D+E	40
EXTERNAL EXAM (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO- a	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO- b	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO- c	**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 -d	**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 -e	**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- f	**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
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PO -l	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO -a	Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power
PSO -b	Design and analyze electrical machines, modern drive and lighting systems
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PSO -d	Design controllers for electrical and electronic systems to improve their performance

Mr.B.Pangedaiah Ms.I.Divya SathyaSree	Mr.B.Pangedaiah	Mr.P.Deepak Reddy	Dr.Sivavara Prasad
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PART - A

PROGRAM : B.Tech., V-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : **ELECTRONIC CIRCUITS AND IC'S LAB** -(17EE67)

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

COURSE CREDITS : 1

Prerequisite: Electronic Circuits and Devices(17EE01), Digital Logic Circuit Design(17EE04)

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This course enables the student to
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CO2	2	1	2	2					3	3		1			2	2
CO3	2	2		1					3	3		1	3		2	2
CO4	2	1	2	2					3	3		1			2	2

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LIST OF EXPERIMENTS

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CYCLE-II

6. Design Monostable and Astable multivibrator circuits using IC 555 timer.
7. Design of Voltage regulator using IC 723.
8. PLL characteristics and frequency multiplier using PLL IC 565.
9. Implementation of 3-bit DAC using Op-Amp.
10. Design Voltage controlled oscillator using IC 566.

ADDITIONAL EXPERIMENTS

11. Voltage regulator using LM723
12. Design of Schmitt trigger.

PART - B

COURSE DELIVERY PLAN (LESSON PLAN)

SECTION-B SCHEDULE

DAY : WEDNESDAY

Batches :

H.T. Nos	I Week	II Week	III Week	IV Week	V Week	VI Week	VII Week	VIII Week	IX Week	X Week	XI Week	XII Week	XIII Week	XIV Week	XV
Tentative date	22/9/21	29/9/21	6/10/21	20/10/21	27/10/21	3/11/21	17/11/21	24/11/21	1/12/21	8/12/21	15/12/21	22/12/21	29/12/21	5/1/22	12/1/22
Actual date															
Section-B (19761A0288 to 19761A0296 19761A0298 to 19761A02A9 and 20765A0212 to 20765A0222)	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	**INTERNAL EXAM**
	DEMO	1	2	3	4	5	6	7	8	9	10				
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	DEMO	1	2	3	4	5	6	7	8	9	10				
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DAY :SATURDAY

Batches :

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ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	1W
II Phase of Instructions	15-11-2021	15-01-2022	8W
II Mid Examinations	17-01-2022	22-01-2022	1W
Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

PART – C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
DAY-TO-DAY MARKS(A)	10
RECORD MARKS (B)	10
INTERNAL EXAM (C)	10
VIVA-VOCE (D)	05
ATTENDANCE (E)	05
Cumulative Internal Examination (CIE) : A+B+C+D+E	40
EXTERNAL EXAM (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO- a	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO- b	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO- c	**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 -d	**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 -e	**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- f	**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 -g	**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- h	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO- i	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO -j	**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- k	**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 -l	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Ms.I.Divya SathyaSree Mr.P.Ratnakar	Mr.B.Pangedaiah	Mr.P.Deepak Reddy	Dr.Sivavara Prasad
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

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L.B. Reddy Nagar, Mylavaram-521 230. Andhra Pradesh, INDIA
Affiliated to JNTUK, Kakinada & Approved by AICTE New Delhi
NAAC Accredited with "B++" grade, Certified by ISO 9001:2015, http://www.lbrce.ac.in
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
Phone: 08659-222933/Extn: 203 hodeee@lbrce.ac.in, eee.lbrce@gmail.com

COURSE HANDOUT

PROGRAM : B.Tech., V-Sem., EEE

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : Microprocessors & Microcontrollers – 17EC22

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : Dr J.Sivavara Prasad

COURSE COORDINATOR : Dr J.Sivavara Prasad

PRE-REQUISITE: Digital Circuits, Computer Organization

COURSE OBJECTIVE : The objective of the Microprocessor and Microcontrollers is to familiarize with the architecture of 8086 processor, assembling language programming and interfacing with various modules. Microcontroller concepts help the student to do any type of industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.

COURSE OUTCOMES (CO)

CO1	Understand the architecture and operation of 8086 microprocessor 8051 microcontroller
CO2	Apply the instructions of 8086/8051 for various applications
CO3	Analyze the operation of peripherals and devices for different applications
CO4	Design a system by interfacing memory, peripherals and I/O devices to 8086/8051

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	PSO 4
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CO2	2	3	-	-	2	-	-	-	-	-	-	-	-	-	-	
CO3	3	-	3	-	-	-	-	-	-	-	-	-	-	3	-	
CO4	2	3	3	-	2	-	-	-	-	-	-	-	-	3	-	

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 Douglas V. Hall, "Micro Processors & Interfacing", TMH, 2007.

T2 A. K. Ray and K.M. Bhurchandi, Advanced Microprocessor And Peripherals,2nd Edition TMH Publishers.

T3 Muhammad Ali Mazidi, Janice GillispieMazidi, Rolin D. Mckinlay "Microcontrollers and Embedded System", Pearson Education Publishers, 2nd Edition

BOS APPROVED REFERENCE BOOKS:

R1 Raj Kamal, Microcontrollers Architecture, Programming, Interfacing and System Design, Pearson Education Publishers.

R2 J. K. Uffenbeck, "The 8088 and 8086 Micro Processors", PHI, 4th Edition, 2003.

R3 Ajay Deshmukh, "Micro Controllers-Theory and Applications", Tata McGraw Hill Publishers.

R4 Kenneth J. Ayala, "The 8051 Micro Controller", Cengage Learning Publishers, 3rd Edition, 2000.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Microprocessor Architecture & Instruction Set

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 Subject	1	22-09-21		TLM1	CO1	A.K.Ray	
2.	Course Outcomes							
3.	Introduction to UNIT-I							
4.	Micro computer based system	1	23-09-21		TLM1	CO1	A.K.Ray	
5.	8086 Block diagram	1	24-09-21		TLM1	CO1	A.K.Ray	
6.	Register organization	1	29-09-21		TLM1	CO1	A.K.Ray	
7.	Addressing Modes of 8086		29-09-21		TLM1	CO1	A.K.Ray	
8.	Instruction set of 8086	1	30-09-21		TLM1	CO2	A.K.Ray	
9.	ALP for arithmetic operations	1	01-10-21		TLM4 TLM5	CO2	A.K.Ray	
10.	ALP for logical operations	1	06-10-21		TLM4 TLM5	CO2	A.K.Ray	
11.	ALP for string operations		06-10-21		TLM4 TLM5	CO2	A.K.Ray	
12.	Assembly Directives and Macro's	1	07-10-21		TLM1	CO2	A.K.Ray	
13.	Simple Programs using Assembler	1	08-10-21		TLM4 TLM5	CO2	A.K.Ray	

No. of classes required to complete UNIT-I: 9	No. of classes taken:

UNIT-II : 8086 Memory and I/O Interfacing

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
14.	Pin diagram of 8086	1	20-10-21		TLM1	CO1	A.K.Ray	
15.	Minimum mode operation of 8086	1	21-10-21		TLM1	CO1		
16.	Timing diagrams for Minimum mode	1	22-10-21		TLM1	CO1	A.K.Ray	
17.	Maximum mode operation of 8086	1	27-10-21		TLM1	CO1	A.K.Ray	
18.	Timing diagrams for Maximum mode	1	28-10-21		TLM1	CO1	A.K.Ray	
19.	Different memories	1	29-10-21		TLM1	CO3	A.K.Ray	
20.	8-bit Memory and I/O interfacing with 8086		29-10-21		TLM1	CO4	A.K.Ray	
21.	16-bit memory and I/O interfacing with 8086	1	03-11-21		TLM1	CO4	A.K.Ray	
22.	Interrupt structure, vector table	1	05-11-21		TLM1	CO4	A.K.Ray	
23.	Interrupt service routines		05-11-21		TLM1	CO4	A.K.Ray	

No. of classes required to complete UNIT-II : 8	No. of classes taken:

UNIT-III : Peripherals and Interfacing:

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
24.	Basic block diagram of 8255	1	17-11-21		TLM1	CO3	A.K.Ray	
25.	Signal description of 8255 and interfacing with 8086	1	18-11-21		TLM1 TLM8	CO4	A.K.Ray	
26.	A/D converter basic diagram Signal description and interfacing with 8086	1	19-11-21		TLM1	CO3	A.K.Ray	
27.	D/A converter basic diagram	1	24-11-21		TLM8	CO3	A.K.Ray	
28.	Signal description of D/A converter and interfacing	1	25-11-21		TLM1	CO4	A.K.Ray	

	with 8086							
29.	Basic block diagram and signal description of 8257-DMA and interfacing with 8086	1	26-11-21		TLM1	CO3	A.K.Ray	
30.	Interfacing 8086 with key board	1	01-12-21		TLM1	CO4	A.K.Ray	
31.	Basic block diagram of 8259 and Cascaded connection of 8259 with 8086	1	02-12-21		TLM1	CO3	A.K.Ray	
No. of classes required to complete UNIT-III: **9**				No. of classes taken:				

UNIT-IV : Microcontrollers

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.	Architecture of 8051	1	03-12-21		TLM1	CO1	Muhammad Ali Mazidi	
33.	Register organization and I/O ports of 8051	1	08-12-21		TLM1	CO1	Muhammad Ali Mazidi	
34.	Memory Organization of 8051	1	09-12-21		TLM1	CO3	Muhammad Ali Mazidi	
35.	Addressing modes of 8051	1	10-12-21		TLM1	CO1	Muhammad Ali Mazidi	
36.	Instruction set of 8051	1	15-12-21		TLM1	CO2	Muhammad Ali Mazidi	
37.	Simple Programs using Stack Pointer	2	16-12-21 17-12-21		TLM5	CO2	Muhammad Ali Mazidi	
38.	Programs using 8051	2	22-12-21 23-12-21		TLM4 TLM5	CO2	Muhammad Ali Mazidi	
No. of classes required to complete UNIT-IV : 09				No. of classes taken:				

UNIT-V : 8051 Interfacing

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.	Modes of timer operation	1	24-12-21		TLM1			
40.	Serial port	1	29-12-21		TLM1			

	operation							
41.	Interrupt structure of 8051	2	30-12-21 31-12-21		TLM1 TLM6			
42.	Interfacing seven segment display	1	05-01-22 06-01-22		TLM2			
43.	Interfacing stepper motor	1	07-01-22		TLM2 TLM8			
44.	Interfacing serial/parallel printer	2	12-01-22 13-01-22		TLM2			
No. of classes required to complete UNIT-V: **8**				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
45.	Advanced microprocessors and microcontrollers	1	14-01-22		TLM2	CO1	1.A.K.Ray 2.Muhammad Ali Mazidi	

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Microprocessor Architecture & Instruction Set

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 Subject	1	20-09-21		TLM1	CO1	A.K.Ray	
2.	Course Outcomes							
3.	Introduction to UNIT-I							
4.	Micro computer based system	1	21-09-21		TLM1	CO1	A.K.Ray	
5.	8086 Block diagram	1	25-09-21		TLM1	CO1	A.K.Ray	
6.	Register organization	1	27-09-21		TLM1	CO1	A.K.Ray	
7.	Addressing Modes of 8086	1	28-09-21		TLM1	CO1	A.K.Ray	
8.	Instruction set of 8086	1	04-10-21		TLM1	CO2	A.K.Ray	
9.	ALP for arithmetic operations	1	05-10-21		TLM4 TLM5	CO2	A.K.Ray	
10.	ALP for logical operations	1	09-10-21		TLM4 TLM5	CO2	A.K.Ray	

11.	ALP for string operations	1	11-10-21		TLM4 TLM5	CO2	A.K.Ray	
12.	Assembly Directives and Macro's	1	12-10-21		TLM1	CO2	A.K.Ray	
13.	Simple Programs using Assembler		12-10-21		TLM4 TLM5	CO2	A.K.Ray	
No. of classes required to complete UNIT-I: 10					No. of classes taken:			

UNIT-II : 8086 Memory and I/O Interfacing

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
14.	Pin diagram of 8086	1	18-10-21		TLM1	CO1	A.K.Ray	
15.	Minimum mode operation of 8086	1	19-10-21		TLM1	CO1		
16.	Timing diagrams for Minimum mode	1	23-10-21		TLM1	CO1	A.K.Ray	
17.	Maximum mode operation of 8086	1	25-10-21		TLM1	CO1	A.K.Ray	
18.	Timing diagrams for Maximum mode	1	26-10-21		TLM1	CO1	A.K.Ray	
19.	Different memories	1	30-10-21		TLM1	CO3	A.K.Ray	
20.	8-bit Memory and I/O interfacing with 8086	1	01-11-21		TLM1	CO4	A.K.Ray	
21.	16-bit memory and I/O interfacing with 8086		01-11-21		TLM1	CO4	A.K.Ray	
22.	Interrupt structure, vector table	1	02-11-21		TLM1	CO4	A.K.Ray	
23.	Interrupt service routines	1	06-11-21		TLM1	CO4	A.K.Ray	
No. of classes required to complete UNIT-II : 09					No. of classes taken:			

UNIT-III : Peripherals and Interfacing:

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
24.	Basic block diagram of 8255	1	08-11-21		TLM1	CO3	A.K.Ray	
25.	Signal description of 8255 and interfacing with 8086	1	09-11-21		TLM1 TLM8	CO4	A.K.Ray	
26.	A/D converter basic diagram Signal description and interfacing with 8086	1	13-11-21		TLM1	CO3	A.K.Ray	

27.	D/A converter basic diagram	1	15-11-21		TLM8	CO3	A.K.Ray	
28.	Signal description of D/A converter and interfacing with 8086	1	16-11-21		TLM1	CO4	A.K.Ray	
29.	Basic block diagram and signal description of 8257-DMA and interfacing with 8086	1	20-11-21		TLM1	CO3	A.K.Ray	
30.	Interfacing 8086 with key board	1	22-11-21		TLM1	CO4	A.K.Ray	
31.	Basic block diagram of 8259 and Cascaded connection of 8259 with 8086	1	23-11-21		TLM1	CO3	A.K.Ray	
No. of classes required to complete UNIT-III: **9**				No. of classes taken:				

UNIT-IV : Microcontrollers

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.	Architecture of 8051	1	27-11-21		TLM1	CO1	Muhammad Ali Mazidi	
33.	Register organization and I/O ports of 8051	1	29-11-21		TLM1	CO1	Muhammad Ali Mazidi	
34.	Memory Organization of 8051	1	30-11-21		TLM1	CO3	Muhammad Ali Mazidi	
35.	Addressing modes of 8051	1	04-12-21		TLM1	CO1	Muhammad Ali Mazidi	
36.	Instruction set of 8051	2	06-12-21 07-12-21		TLM1	CO2	Muhammad Ali Mazidi	
37.	Simple Programs using Stack Pointer	1	11-12-21		TLM5	CO2	Muhammad Ali Mazidi	
38.	Programs using 8051	2	13-12-21 14-12-21		TLM4 TLM5	CO2	Muhammad Ali Mazidi	
No. of classes required to complete UNIT-IV : 09				No. of classes taken:				

UNIT-V : 8051 Interfacing

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.	Modes of timer operation	2	18-12-21 20-12-21		TLM1			
40.	Serial port operation	1	21-12-21		TLM1			
41.	Interrupt structure of 8051	2	27-12-21 28-12-21		TLM1 TLM6			
42.	Interfacing seven segment display	1	03-01-22 04-01-22		TLM2			
43.	Interfacing stepper motor	2	08-01-22 10-01-22		TLM2 TLM8			
44.	Interfacing serial/parallel printer	1	11-01-22		TLM2			
No. of classes required to complete UNIT-V:**9**				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
45.	Advanced microprocessors and microcontrollers	1	15-01-22		TLM2	CO1	1.A.K.Ray 2.Muhammad Ali Mazidi	

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	20-09-2021	06-11-2021	8W
I Mid Examinations	08-12-2021	13-11-2021	
II Phase of Instructions	15-11-2021	15-01-2022	9W
II Mid Examinations	17-01-2022	22-01-2022	
Preparation and Practical's	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

EVALUATION PROCESS:

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

PEOs(Program Educational Objectives):

PEO1. Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.
PEO2. Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.
PEO3. Work effectively as individuals and as team members in multidisciplinary projects.
PEO4.Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

POs:(Program Outcomes)
a: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b:. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c: 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.
d: 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.

e: 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.

f: 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.

g: 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.

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

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

j: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.

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

l: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.

PSOs(Program Specific Outcomes)

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power

PSO b: Design and analyze electrical machines, modern drive and lighting systems

PSO c: Specify, design, implement and test analog and embedded signal processing electronic systems

PSO d: Design controllers for electrical and electronic systems to improve their performance

Dr J.Sivavara Prasad **Course Instructor**	Dr J.Sivavara Prasad **Course Coordinator**	Dr J.Sivavara Prasad **Module Coordinator**	Dr.J.S.V.Prasad **HOD**