



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

DEPARTMENT OF EEE

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. M. Uma Vani

Course Name & Code : Universal Human Values-II (20HS01)

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

Program/Sem/Sec : B.Tech/IV/A & B

Credits: 3

A.Y.: 2021-22

PREREQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): To become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

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

CO1	Apply the value inputs in life and profession (Apply – L3)
CO2	Distinguish between values and skills, happiness and accumulation of physical facilities, the self, and the Body (Understand – L2)
CO3	Understand the role of a human being in ensuring harmony in society (Understand – L2)
CO4	Understand the role of a human being in ensuring harmony in the nature and existence. (Understand – L2)
CO5	Distinguish between ethical and unethical practices (Apply – L3)

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

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

TEXTBOOKS:

- Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

REFERENCE:

- Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
- Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
- The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi

PART-B

COURSE DELIVERY PLAN (LESSON PLAN-A/Sec) (Commencement of Classwork:7-3-2022)

UNIT-I: Need, Basic Guidelines, Content and Process for Value Education

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.	'Natural Acceptance' and Experiential Validation	1	9-3-2022		TLM1/2	
2.	Process for self-exploration	1	11-3-2022		TLM1/2	
3.	Continuous Happiness and Prosperity	1	14-3-2022		TLM1/2	
4.	A look at basic Human Aspirations	1	16-3-2022		TLM1/2	
5.	Quiz	1	19-3-2022		TLM3	
6.	Right understanding, Relationship and Physical Facility	2	21-3-2022, 23-3-2022,		TLM1/2	
7.	Understanding Happiness, and Prosperity	2	25-3-2022, 26-3-2022		TLM1/2	
8.	Active learning activity	1	28-3-2022		TLM6	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

UNIT-II: Understanding Harmony in the Human Being - Harmony in Myself!

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
9.	Understanding human being as a co-existence of the sentient 'I' and the material 'Body'	1	30-3-2022		TLM1/2	
10.	Understanding the needs of Self ('I') and 'Body'-happiness and physical facility	1	1-4-2022		TLM1/2	
11.	Active learning activity	1	4-4-2022		TLM6	
12.	Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)	1	6-4-2022		TLM1/2	
13.	Understanding the characteristics and activities of 'I' and harmony in 'I'	1	8-4-2022		TLM1/2,	
14.	Understanding the harmony of I with the Body: San yam and Health	2	11-4-2022, 13-4-2022		TLM1/2	
15.	Active learning activity	1	16-4-2022		TLM6	
16.	Correct appraisal of Physical needs, meaning of Prosperity in detail	1	18-4-2022		TLM1/2	
17.	Quiz/Activity	1	20-4-2022		TLM3	
No. of classes required to complete UNIT-II: 10				No. of classes taken:		

UNIT-III: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Understanding values in human-human relationship	1	22-4-2022		TLM1/2	
19.	Meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness	1	23-4-2022		TLM1/2	
20.	Active learning activity	1	2-5-2022		TLM6	
21.	Trust and Respect as the foundational values of relationship	1	4-5-2022		TLM1/2	
22.	Understanding the harmony in the society: Resolution, Prosperity, fearlessness and co-existence as comprehensive Human Goals	2	6-5-2022, 9-5-2022		TLM1/2	

23.	Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family	1	11-5-2022		TLM1/2	
24.	Active learning activity	1	13-5-2022		TLM6	
25.	Gratitude as a universal value in relationships.	1	14-5-2022		TLM1/2	
26.	Quiz/Activity	1	16-5-2022		TLM3	
No. of classes required to complete UNIT-III:10				No. of classes taken:		

UNIT-IV: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

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.	Understanding the harmony in the Nature	1	18-5-2022		TLM1/2	
28.	Active learning activity	1	20-5-2022		TLM6	
29.	Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature	2	21-5-2022, 23-5-2022		TLM1/2	
30.	Understanding Existence as Co-existence of mutually interacting units in all-pervasive space	2	25-5-2022, 27-5-2022		TLM1/2	
31.	Active learning activity	1	28-5-2022		TLM6	
32.	Holistic perception of harmony at all levels of existence.	1	30-5-2022		TLM1/2	
33.	Quiz/Activity	1	1-6-2022		TLM3	
No. of classes required to complete UNIT-IV: 9				No. of classes taken:		

UNIT-V: Implications of the above Holistic Understanding of Harmony on Professional Ethics

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.	Natural acceptance of human values; Definitiveness of Ethical Human Conduct	1	3-6-2022		TLM1/2	
35.	Active learning activity	1	4-6-2022		TLM6	
36.	Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order	2	6-6-2022, 8-6-2022		TLM1/2	
37.	Competence in professional ethics, Strategy for transition from the present state to Universal Human Order	2	10-6-2022, 13-6-2022		TLM1/2	
38.	Quiz	1	15-6-2022		TLM3	
39.	Revision	1	17-6-2022		TLM1/2	
40.	Revision	1	18-6-2022		TLM1/2	
No. of classes required to complete UNIT-V: 7				No. of classes taken:		
Mid-II from 20-6-2022 to 25-6-2022						

*SOC hour (allotted additional)

COURSE DELIVERY PLAN (LESSON PLAN-B/Sec): (Commencement of Classwork:7-3-2022)**UNIT-I: Need, Basic Guidelines, Content and Process for Value Education**

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.	'Natural Acceptance' and Experiential Validation	1	7-3-2022		TLM1/2	
2.	Process for self-exploration	1	8-3-2022		TLM1/2	
3.	Continuous Happiness and Prosperity	1	10-3-2022		TLM1/2	
4.	A look at basic Human Aspirations	1	14-3-2022		TLM1/2	
5.	Quiz	1	15-3-2022		TLM3	
6.	Right understanding, Relationship and Physical Facility	2	17-3-2022, 19-3-2022		TLM1/2	
7.	Understanding Happiness, and Prosperity	2	21-3-2022, 22-3-2022		TLM1/2	
8.	Active learning activity	1	24-3-2022		TLM6	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

UNIT-II: Understanding Harmony in the Human Being - Harmony in Myself!

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
9.	Understanding human being as a co-existence of the sentient 'I' and the material 'Body'	1	26-3-2022		TLM1/2	
10.	Understanding the needs of Self ('I') and 'Body'-happiness and physical facility	1	28-3-2022		TLM1/2	
11.	Active learning activity	1	29-3-2022		TLM6	
12.	Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)	1	31-3-2022		TLM1/2	
13.	Understanding the characteristics and activities of 'I' and harmony in 'I'	1	4-4-2022		TLM1/2,	
14.	Understanding the harmony of I with the Body: San yam and Health	2	7-4-2022, 11-4-2022		TLM1/2	
15.	Active learning activity	1	12-4-2022		TLM6	
16.	Correct appraisal of Physical needs, meaning of Prosperity in detail	1	16-4-2022		TLM1/2	
17.	Quiz/Activity	1	18-4-2022		TLM3	
No. of classes required to complete UNIT-II: 10				No. of classes taken:		

UNIT-III: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Understanding values in human-human relationship	1	19-4-2022		TLM1/2	
19.	Meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness	1	21-4-2022		TLM1/2	
20.	Active learning activity	1	23-4-2022		TLM6	
21.	Trust and Respect as the foundational values of relationship	1	2-5-2022		TLM1/2	
22.	Understanding the harmony in the society: Resolution, Prosperity,	2	5-5-2022, 9-5-2022		TLM1/2	

	fearlessness and co-existence as comprehensive Human Goals					
23.	Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family	1	10-5-2022		TLM1/2	
24.	Active learning activity	1	12-5-2022		TLM6	
25.	Gratitude as a universal value in relationships.	1	14-5-2022		TLM1/2	
26.	Quiz/Activity	1	16-5-2022		TLM3	
No. of classes required to complete UNIT-III: 10				No. of classes taken:		

UNIT-IV: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

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.	Understanding the harmony in the Nature	1	17-5-2022		TLM1/2	
28.	Active learning activity	1	19-5-2022		TLM6	
29.	Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature	2	21-5-2022, 23-5-2022		TLM1/2	
30.	Understanding Existence as Co-existence of mutually interacting units in all-pervasive space	2	24-5-2022, 26-5-2022		TLM1/2	
31.	Active learning activity	1	28-5-2022		TLM6	
32.	Holistic perception of harmony at all levels of existence.	1	30-5-2022		TLM1/2	
33.	Quiz/Activity	1	31-5-2022		TLM3	
No. of classes required to complete UNIT-IV: 9				No. of classes taken:		

UNIT-V: Implications of the above Holistic Understanding of Harmony on Professional Ethics

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.	Natural acceptance of human values; Definitiveness of Ethical Human Conduct	1	2-6-2022		TLM1/2	
35.	Active learning activity	1	4-6-2022		TLM6	
36.	Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order	2	6-6-2022, 7-6-2022		TLM1/2	
37.	Competence in professional ethics, Strategy for transition from the present state to Universal Human Order	2	9-6-2022, 13-6-2022		TLM1/2	
38.	Quiz	1	14-6-2022		TLM3	
39.	Revision	1	16-6-2022		TLM1/2	
40.	Revision	1	18-6-2022		TLM1/2	
No. of classes required to complete UNIT-V: 7				No. of classes taken:		
Mid-II from 20-6-2022 to 25-6-2022						

*SOC hour allotted additional

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

PART-C

EVALUATION PROCESS (R20 Regulation)

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	D1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): D+Q+A	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs)

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

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

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.

Title	Course Instructor	Course Coordinator	HoD
Name of the Faculty	Dr.M.UmaVani	Dr.M.UmaVani	Dr.J.S.V.Prasad
Signature			



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. P.SRIHARI

Course Name & Code : POWER SYSTEMS-I –20EE08

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

Program/Sem/Sec : B.Tech/IV/A

Credits: 3

A.Y.: 2021-22

PREREQUISITES: Fundamentals of Electrical Engineering & Basic Civil and Mechanical Engineering

Course Educational Objective: This course enables the student to learn different types of non-renewable power generation methods, various types of renewable power sources, the modes of power transmission, the economic aspects of power generation, tariff methods and design aspects of transmission lines.

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

CO1: Understand the operation of non-renewable electrical power generating stations
(Understand-L2)

CO2: Illustrate the economic aspects of power generation (Apply-L3)

CO3: Understand the a.c distribution system and performance of insulated cables (Understand-L2)

CO4: Evaluate the electrical and mechanical parameters of transmission lines (Apply-L3)

CO5: Analyze operation of overhead line insulators and phenomena of corona (Understand-L2)

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

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSOa	PSOb	PSOc	PSOd
CO1	3	2				3	3				2	2	2			
CO2	3	2				3					2	2	2			
CO3	3	2	1		2		3					1	1	1		
CO4	3	2	1		2		3					1	1	1		
CO5	3	2	1		2							1	1	1		

TEXT BOOKS:

T1	Soni, Gupta & Bahtnagar, Power Systems Engineering, Dhanpat Rai & Sons, 2016.
T2	C.L. Wadhwa, Electrical Power Systems, 6 th Edition, New Age International, 2009.

REFERENCE BOOKS:

R1	M.V. Deshpande, Elements of Electrical Power Station Design, 3 rd , Wheeler Pub. 1997.
R2	C.L. Wadhwa, Generation, Distribution and Utilization of Electrical Energy, 3 rd Edition, New Age International, 2015.
R3	V K Mehta & Rohit Mehta, Principles of Power Systems (Multicolor Edition), 24/e, S.Chand Publishing, 4 th Edition, 2005.
R4	W.D. Stevenson, Elements of Power System Analysis, 4 th Edition, McGraw Hill, 1982.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN)

UNIT-I: POWER GENERATION 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	Introduction	1	07-03-2022		TLM1	
2.	Typical layout of an electrical power system	1	08-03-2022		TLM1	
3.	Present power scenario in India	1	10-03-2022		TLM1	
4.	Generation of electric power Tutorial-1	1	11-03-2022		TLM3	
5.	Hydro station	1	14-03-2022		TLM1	
6.	Hydro station	1	15-03-2022		TLM1	
7.	Steam power plant	1	17-03-2022		TLM1	
8.	Steam power plant	1	21-03-2022		TLM1	
9.	Nuclear power plant	1	22-03-2022		TLM1	
10.	Nuclear power plant	1	24-03-2022		TLM1	
11.	Tutorial-2	1	25-03-2022		TLM3	
12.	Gas turbine plant		28-03-2022		TLM1	
No. of classes required to complete UNIT-I: 12				No. of classes taken:		

UNIT-II: ECONOMICS OF GENERATION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Introduction, definitions of connected load, maximum demand	1	29-03-2022		TLM1	
14.	Demand factor, load factor, diversity factor, Load duration curve, number and size of generator units	1	31-03-2022		TLM1	
15.	Problems-Tutorial-3	1	01-04-2022		TLM3	
16.	Base load and peak load plants	1	04-04-2022		TLM1	
17.	Cost of electrical energy-fixed cost, running cost	1	05-04-2022		TLM1	
18.	Tariff on charge to customer	1	07-04-2022		TLM1	
No. of classes required to complete UNIT-II: 06				No. of classes taken:		

UNIT-III: AC DISTRIBUTION & 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.	Introduction, AC distribution	1	08-04-2022		TLM3	
20.	Single phase, 3-phase-3wire, 3 phase 4 wire system	1	11-04-2022		TLM1	
21.	Bus bar arrangement	1	12-04-2022		TLM1	
22.	Selection of site and layout of substation.	1	18-04-2022		TLM1	
23.	Insulated Cables: Introduction	1	19-04-2022		TLM1	
24.	Insulation, insulating materials	1	21-04-2022		TLM1	
25.	Tutorial-4	1	22-04-2022		TLM3	

26.	Extra high voltage cables, grading of cables	1	02-05-2022		TLM1
27.	Insulation resistance of a cable	1	05-05-2022		TLM1
28.	Tutorial-5	1	06-05-2022		TLM3
29.	capacitance of a single core and three core cables	1	09-05-2022		TLM1
30.	overhead lines versus underground cables	1	10-05-2022		TLM1
31.	Types of cables	1	12-05-2022		TLM1
No. of classes required to complete UNIT-III: 13				No. of classes taken:	

Unit-IV: ELECTRICAL AND MECHANICAL 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
32.	Transmission line sag calculation Tutorial-6	1	13-05-2022		TLM3	
33.	The catenary curve, sag tension calculations, supports at different levels, stringing Chart	1	16-05-2022		TLM1	
34.	Inductance and capacitance calculations of transmission lines	1	17-05-2022		TLM1	
35.	line conductors, inductance and capacitance of single phase	1	19-05-2022		TLM1	
36.	Tutorial-7	1	20-05-2022		TLM3	
37.	line conductors, inductance and capacitance of three phase lines with symmetrical spacing	1	23-05-2022		TLM1	
38.	line conductors, inductance and capacitance of three phase lines with unsymmetrical spacing	1	24-05-2022		TLM1	
39.	Composite conductors-transposition	1	26-05-2022		TLM1	
40.	Tutorial-8	1	27-05-2022		TLM3	
41.	Bundled conductors	1	30-05-2022		TLM1	
42.	Effect of earth on capacitance.	1	31-05-2022		TLM1	
43.	Inductance and capacitance calculations	1	02-06-2022		TLM1	
44.	Tutorial-9	1	03-06-2022		TLM3	
No. of classes required to complete UNIT-IV: 13				No. of classes taken:		

UNIT-V: CORONA& INSULATORS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Introduction, disruptive critical voltage, corona loss, Factors affecting corona loss	1	06-06-2022		TLM1	
46.	Methods of reducing corona loss, Disadvantages of corona	1	07-06-2022		TLM1	
47.	Interference between power and Communication lines	1	09-06-2022		TLM1	
48.	Tutorial-10	1	10-06-2022		TLM3	
49.	Overhead Line Insulators: Introduction, types of	1	13-06-2022		TLM1	

	insulators				
50.	Potential distribution over a string of suspension insulators	1	14-06-2022		TLM1
51.	Methods of equalizing the potential, testing of insulators	1	16-06-2022		TLM1
52.	Content beyond syllabus	1	17-06-2022		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 (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.P.SRIHARI	Mr.P.SRIHARI	Mr.P.DEEPAK REDDY	Dr.J.SIVAVARA PRASAD
Signature				



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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. Imran Abdul

Course Name & Code : POWER SYSTEMS-I -20EE08

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

Credits: 3

Program/Sem/Sec : B.Tech/IV/B

A.Y.: 2021-22

PREREQUISITES: Fundamentals of Electrical Engineering & Basic Civil and Mechanical Engineering

Course Educational Objective: This course enables the student to learn different types of non-renewable power generation methods, various types of renewable power sources, the modes of power transmission, the economic aspects of power generation, tariff methods and design aspects of transmission lines.

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

CO1: Understand the operation of non-renewable electrical power generating stations
(Understand-L2)

CO2: Illustrate the economic aspects of power generation (Apply-L3)

CO3: Understand the a.c distribution system and performance of insulated cables (Understand-L2)

CO4: Evaluate the electrical and mechanical parameters of transmission lines (Apply-L3)

CO5: Analyze operation of overhead line insulators and phenomena of corona (Understand-L2)

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	2				3	3				2	2	2			
CO2	3	2				3					2	2	2			
CO3	3	2	1		2		3					1	1	1		
CO4	3	2	1		2		3					1	1	1		
CO5	3	2	1		2							1	1	1		

TEXT BOOKS:

T1	Soni, Gupta & Bahtnagar, Power Systems Engineering, Dhanpat Rai & Sons, 2016.
T2	C.L. Wadhwa, Electrical Power Systems, 6 th Edition, New Age International, 2009.

REFERENCE BOOKS:

R1	M.V. Deshpande, Elements of Electrical Power Station Design, 3 rd , Wheeler Pub. 1997.
R2	C.L. Wadhwa, Generation, Distribution and Utilization of Electrical Energy, 3 rd Edition, New Age International, 2015.
R3	V K Mehta & Rohit Mehta, Principles of Power Systems (Multicolor Edition), 24/e, S.Chand Publishing, 4 th Edition, 2005.
R4	W.D. Stevenson, Elements of Power System Analysis, 4 th Edition, McGraw Hill, 1982.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN)

UNIT-I: POWER GENERATION 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.	Introduction	1	07-03-2022		TLM1	
2.	Typical layout of an electrical power system	1	09-03-2022		TLM1	
3.	Present power scenario in India	1	10-03-2022		TLM1	
4.	Generation of electric power Tutorial-1	1	11-03-2022		TLM3	
5.	Hydro station	1	14-03-2022		TLM2	
6.	Hydro station	1	16-03-2022		TLM1	
7.	Steam power plant	1	17-03-2022		TLM2	
8.	Steam power plant Tutorial-1	1	21-03-2022		TLM1	
9.	Nuclear power plant	1	23-03-2022		TLM2	
10.	Nuclear power plant	1	24-03-2022		TLM1	
11.	Gas turbine plant	1	25-03-2022		TLM2	
12.	Tutorial-2	1	28-03-2022		TLM3	
No. of classes required to complete UNIT-I: 12				No. of classes taken:		

UNIT-II: ECONOMICS OF GENERATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
13.	Introduction, definitions of connected load, maximum demand	1	30-03-2022		TLM1		
14.	Demand factor, load factor, diversity factor, Load duration curve, number and size of generator units	1	31-03-2022		TLM1		
15.	Base load and peak load plants	1	01-04-2022		TLM3		
16.	Tutorial-3	1	04-04-2022		TLM1		
17.	Cost of electrical energy-fixed cost, running cost	1	06-04-2022		TLM1		
18.	Tariff on charge to customer	1	07-04-2022		TLM1		
No. of classes required to complete UNIT-II: 06				No. of classes taken:			

UNIT-III: AC DISTRIBUTION & 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.	Introduction, AC distribution	1	08-04-2022		TLM3	
20.	Single phase, 3-phase-3wire, 3 phase 4 wire system	1	11-04-2022		TLM1	
21.	Bus bar arrangement	1	13-04-2022		TLM1	
22.	Tutorial-4	1	18-04-2022		TLM3	
23.	Insulated Cables: Introduction	1	20-04-2022		TLM1	
24.	Insulation, insulating materials	1	21-04-2022		TLM1	
25.	Extra high voltage cables, grading of cables	1	22-04-2022		TLM1	

26.	Extra high voltage cables, grading of cables	1	02-05-2022		TLM1	
27.	Insulation resistance of a cable	1	04-05-2022		TLM1	
28.	capacitance of a single core and three core cables	1	05-05-2022		TLM1	
29.	overhead lines versus underground cables	1	06-05-2022		TLM1	
30.	Tutorial-5	1	09-05-2022		TLM3	
31.	Types of cables	1	11-05-2022		TLM1	
No. of classes required to complete UNIT-III: 13				No. of classes taken:		

Unit-IV: ELECTRICAL AND MECHANICAL 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
32.	Transmission line sag calculation	1	12-05-2022		TLM1	
33.	The catenary curve, sag tension calculations, supports at different levels, stringing Chart	1	13-05-2022		TLM1	
34.	Tutorial-6	1	16-05-2022		TLM3	
35.	Inductance and capacitance calculations of transmission lines	1	18-05-2022		TLM1	
36.	line conductors, inductance and capacitance of single phase	1	19-05-2022		TLM1	
37.	line conductors, inductance and capacitance of three phase lines with symmetrical spacing	1	20-05-2022		TLM1	
38.	Tutorial-7	1	23-05-2022		TLM3	
39.	line conductors, inductance and capacitance of three phase lines with unsymmetrical spacing	1	25-05-2022		TLM1	
40.	Composite conductors-transposition	1	26-05-2022		TLM1	
41.	Bundled conductors	1	27-05-2022		TLM1	
42.	Tutorial-8	1	30-05-2022		TLM3	
43.	Effect of earth capacitance.	1	01-06-2022		TLM1	
44.	Inductance and capacitance calculations	1	02-06-2022		TLM1	
No. of classes required to complete UNIT-IV: 13				No. of classes taken:		

UNIT-V: CORONA& INSULATORS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Introduction, disruptive critical voltage, corona loss, Factors affecting corona loss	1	03-06-2022		TLM1	
46.	Tutorial-9	1	06-06-2022		TLM3	
47.	Methods of reducing corona loss, Disadvantages of corona	1	08-06-2022		TLM1	
48.	Interference between power and Communication lines	1	09-06-2022		TLM1	
49.	Overhead Line Insulators: Introduction, types of insulators	1	10-06-2022		TLM1	

50.	Tutorial-10		13-06-2022		TLM3
51.	Potential distribution over a string of suspension insulators	1	15-06-2022		TLM1
52.	Methods of equalizing the potential, testing of insulators	1	16-06-2022		TLM1
53.	Content beyond syllabus	1	17-06-2022		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 (R20 Regulation):

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

PART-D

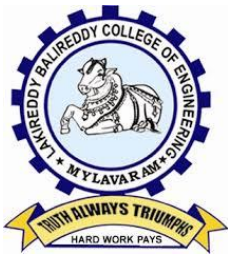
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PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.IMRAN ABDUL	Mr.P.SRIHARI	Mr.P.DEEPAK REDDY	Dr.J.SIVAVARA PRASAD
Signature				



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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Ms. G. Tabita

Course Name & Code : CONTROL SYSTEMS –20EE09

L-T-P Structure : 2-1-0

Program/Sem/Sec : B.Tech/IV/A

Credits: 3

A.Y.: 2021-22

PREREQUISITE: Electrical circuit Analysis and Applied Physics

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to introduce to the students the principles and applications of control systems in everyday life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

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

CO1	Develop mathematical models of systems in terms of transfer function and state-space.(Apply-L3)
CO2	Analyze control systems in time domain (Apply-L3)
CO3	Analyze control systems in frequency domain (Apply-L3)
CO4	Understand the concepts of controllers and compensators.(Understand-L2)

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	2	2											2			3
CO2	2	2	2											2		2
CO3	2	2	2									1	2			2
CO4	2	2	2									2	2			2
			1 - Low				2 -Medium				3 - High					

TEXTBOOKS:

T1	B. C. Kuo , “Automatic Control Systems” John Wiley and Sons ,9 th edition,2014.
T2	I. J. Nagrath and M. Gopal, “Control Systems Engineering”, New Age International (P) Limited Publishers,6 th edition,2018.

REFERENCE BOOKS:

R1	Katsuhiko Ogata , “Modern Control Engineering”, Prentice Hall of India Pvt. Ltd., 5th edition,2009
R2	Norman S. Nise, Control Systems Engineering, 8 th Edition, John Wiley, New Delhi,
R3	Richard C Dorf, Robert H Bishop, Modern control systems , 12 th edition, Prentice Hall (Pearson education, Inc.), New Delhi 2010.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: MATHEMATICAL MODELLING OF CONTROL 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.	Concepts of Control Systems- Open Loop and Closed Loop control systems.	1	07-03-2022		TLM1	
2.	Mathematical modeling – Transfer function,	1	09-03-2022		TLM1	
3.	Modeling of electrical systems	1	10-03-2022		TLM1	
4.	Modeling of mechanical systems	1	11-03-2022		TLM1	
5.	Modeling of mechanical systems	1	14-03-2022		TLM1	
6.	Electrical analogy of mechanical systems.	1	16-03-2022		TLM2	
7.	Block diagram representation of systems	1	17-03-2022		TLM1	
8.	Block diagram algebra	1	21-03-2022		TLM1	
9.	Tutorial-1	1	23-03-2022		TLM3	
10.	Signal flow graph – reduction using Mason's gain	1	24-03-2022		TLM1	
11.	Feedback Control System Characteristics- Sensitivity of Control Systems to Parameter Variations, Disturbance Signals in a Feedback Control System.	2	25-03-2022 28-03-2022		TLM1	
12.	Tutorial-2	1	30-03-2022		TLM3	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: TIME RESPONSE ANALYSIS-I

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Standard test signals, Step response of first order systems	1	31-03-2022		TLM1	
14.	Step response of second order systems	1	01-04-2022		TLM1	
15.	Time response specifications, Time response specifications of second order systems	1	04-04-2022		TLM1	
16.	steady state errors and error constants	1	06-04-2022		TLM1	
17.	Tutorial-3	1	07-04-2022		TLM3	
18.	Introduction to PI, PD and PID Controllers (excluding design).	1	08-04-2022		TLM1	
No. of classes required to complete UNIT-II: 06				No. of classes taken:		

UNIT-III: TIME RESPONSE ANALYSIS-II

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Concepts of stability	1	11-04-2022		TLM1	
20.	Necessary conditions for Stability	1	13-04-2022		TLM1	
21.	Routh-stability criterion	1	18-04-2022		TLM1	
22.	Problems	1	20-04-2022		TLM1	
23.	problems	1	21-04-2022		TLM1	
24.	problems	1	22-04-2022		TLM1	
25.	Tutorial-4	1	02-05-2022		TLM3	

26.	Relative stability analysis	1	04-05-2022		TLM1
27.	Introduction to Root Locus Technique	1	05-05-2022		TLM1
28.	problems	1	06-05-2022		TLM1
29.	Tutorial-5	1	09-05-2022		TLM3
30.	Construction of rootloci.	1	11-05-2022		TLM1
31.	problems	1	12-05-2022		TLM1
No. of classes required to complete UNIT-III: 13				No. of classes taken:	

UNIT-IV:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Frequency domain specifications	1	13-05-2022		TLM1	
33.	Frequency response of standard second order system	1	16-05-2022		TLM1	
34.	Bode Plot -	1	18-05-2022		TLM1	
35.	determination of frequency domain specifications	1	19-05-2022		TLM1	
36.	phase margin and gain margin	1	20-05-2022		TLM1	
37.	Tutorial-6	1	23-05-2022		TLM3	
38.	problems	1	25-05-2022		TLM1	
39.	determination of transfer function from the Bode Plot.	1	26-05-2022		TLM1	
40.	Polar plot, Nyquist plot	1	27-05-2022		TLM1	
41.	Tutorial-7	1	30-05-2022		TLM3	
42.	Nyquist Stability criteria	1	01-06-2022		TLM1	
43.	Introduction to Lag, Lead, Lead-Lag Compensator(excluding design).	1	02-06-2022		TLM1	
44.	problems	1	03-06-2022		TLM1	
No. of classes required to complete UNIT-IV: 13				No. of classes taken:		

UNIT-V: STATE SPACE ANALYSIS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Concept of state variables – State models for linear and time invariant Systems	1	06-06-2022		TLM1	
46.	The Transfer Function from the State Equation	1	08-06-2022		TLM1	
47.	Solution of state equation–State transition matrix and it's properties	1	09-06-2022		TLM1	
48.	Concepts of controllability and observability.	1	10-06-2022		TLM1	
49.	Tutorial-8	1	13-06-2022		TLM3	
50.	problems	1	15-06-2022		TLM1	
51.	problems	1	16-06-2022		TLM1	
52.	Revision	1	17-06-2022		TLM2	
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 (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mrs. G. Tabita	Mr.CH.RAJESH	Dr. P. Sobha Rani	Dr.J. Sivavara Prasad
Signature				



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. CH.RAJESH

Course Name & Code : CONTROL SYSTEMS -20EE09

L-T-P Structure : 2-1-0

Program/Sem/Sec : B.Tech/IV/B

Credits: 3

A.Y.: 2021-22

PREREQUISITE: Electrical circuit Analysis and Applied Physics

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to introduce to the students the principles and applications of control systems in everyday life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

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

CO1	Develop mathematical models of systems in terms of transfer function and state-space.(Apply-L3)
CO2	Analyze control systems in time domain (Apply-L3)
CO3	Analyze control systems in frequency domain (Apply-L3)
CO4	Understand the concepts of controllers and compensators.(Understand-L2)

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	2	2											2			3
CO2	2	2	2											2		2
CO3	2	2	2									1	2			2
CO4	2	2	2									2	2			2
	1 - Low			2 -Medium						3 - High						

TEXTBOOKS:

T1	B. C. Kuo , “Automatic Control Systems” John Wiley and Sons ,9 th edition,2014.
T2	I. J. Nagrath and M. Gopal, “Control Systems Engineering”, New Age International (P) Limited Publishers,6 th edition,2018.

REFERENCE BOOKS:

R1	Katsuhiko Ogata , “Modern Control Engineering”, Prentice Hall of India Pvt. Ltd., 5th edition,2009
R2	Norman S. Nise, Control Systems Engineering, 8 th Edition, John Wiley, New Delhi,
R3	Richard C Dorf, Robert H Bishop, Modern control systems , 12 th edition, Prentice Hall (Pearson education, Inc.), New Delhi 2010.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: MATHEMATICAL MODELLING OF CONTROL 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	Concepts of Control Systems- Open Loop and Closed Loop control systems.	1	08-03-2022		TLM1	
2.	Mathematical modeling –Transfer function,	1	11-03-2022		TLM1	
3.	Modeling of electrical systems	1	12-03-2022		TLM1	
4.	Modeling of mechanical systems	1	14-03-2022		TLM1	
5.	Modeling of mechanical systems	1	15-03-2022		TLM1	
6.	Electrical analogy of mechanical systems.	1	19-03-2022		TLM2	
7.	Block diagram representation of systems	1	21-03-2022		TLM1	
8.	Block diagram algebra	1	22-03-2022		TLM1	
9.	Tutorial-1	1	25-03-2022		TLM3	
10.	Signal flow graph – reduction using Mason's gain	1	26-03-2022		TLM1	
11.	Feedback Control System Characteristics- Sensitivity of Control Systems to Parameter Variations, Disturbance Signals in a Feedback Control System.	2	28-03-2022 29-03-2022		TLM1	
12.	Tutorial-2	1	01-04-2022		TLM3	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: TIME RESPONSE ANALYSIS-I

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Standard test signals, Step response of first order systems	1	04-04-2022		TLM1	
14.	Step response of second order systems	1	05-04-2022		TLM1	
15.	Time response specifications, Time response specifications of second order systems	1	08-04-2022		TLM1	
16.	steady state errors and error constants	1	09-04-2022		TLM1	
17.	Tutorial-3	1	11-04-2022		TLM3	
18.	Introduction to PI, PD and PID Controllers (excluding design).	1	12-04-2022		TLM1	
No. of classes required to complete UNIT-II: 06				No. of classes taken:		

UNIT-III: TIME RESPONSE ANALYSIS-II

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Concepts of stability	1	16-04-2022		TLM1	
20.	Necessary conditions for Stability	1	18-04-2022		TLM1	
21.	Routh-stability criterion	1	19-04-2022		TLM1	
22.	Problems	1	22-04-2022		TLM1	
23.	problems	1	23-04-2022		TLM1	
24.	problems	1	02-05-2022		TLM1	
25.	Tutorial-4	1	06-05-2022		TLM3	
26.	Relative stability analysis	1	07-05-2022		TLM1	
27.	Introduction to Root Locus Technique	1	09-05-2022		TLM1	

28.	problems	1	10-05-2022		TLM1	
29.	Tutorial-5	1	13-05-2022		TLM3	
30.	Construction of rootloci.	1	14-05-2022		TLM1	
31.	problems	1	16-05-2022		TLM1	
No. of classes required to complete UNIT-III: 13				No. of classes taken:		

UNIT-IV:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Frequency domain specifications	1	17-05-2022		TLM1	
33.	Frequency response of standard second order system	1	20-05-2022		TLM1	
34.	Bode Plot -	1	21-05-2022		TLM1	
35.	determination of frequency domain specifications	1	23-05-2022		TLM1	
36.	phase margin and gain margin	1	24-05-2022		TLM1	
37.	Tutorial-6	1	27-05-2022		TLM3	
38.	problems	1	28-05-2022		TLM1	
39.	determination of transfer function from the Bode Plot.	1	30-05-2022		TLM1	
40.	Polar plot, Nyquist plot	1	31-05-2022		TLM1	
41.	Tutorial-7	1	03-06-2022		TLM3	
42.	Nyquist Stability criteria	1	04-06-2022		TLM1	
43.	Introduction to Lag, Lead, Lead-Lag Compensator(excluding design).	1	06-06-2022		TLM1	
44.	problems	1	07-06-2022		TLM1	
No. of classes required to complete UNIT-IV: 13				No. of classes taken:		

UNIT-V: STATE SPACE ANALYSIS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Concept of state variables – State models for linear and time invariant Systems	1	10-06-2022		TLM1	
46.	The Transfer Function from the State Equation	1	11-06-2022		TLM1	
47.	Solution of state equation–State transition matrix and it's properties	1	13-06-2022		TLM1	
48.	Concepts of controllability and observability.	1	14-06-2022		TLM1	
49.	Tutorial-8	1	17-06-2022		TLM3	
50.	problems	1	18-06-2022		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 (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.CH.RAJESH	Mrs. G. Tabita	Dr. P. Sobha Rani	Dr.J. Sivavara Prasad
Signature				



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING.

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. R.ANJANEYULU NAIK,
Course Name & Code : Analog Electronics - 20EE10
L-T-P Structure : 2-1-0 Credits : 3
Program/Sem/Sec : B.Tech., EEE., IV-Sem., Sections- A A.Y : 2021-22

PRE-REQUISITE: Electronic Circuits and Devices and Network Theory

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to analyze various electronic circuits like large signal amplifiers, feedback amplifiers, high pass, low pass RC circuits, clippers, clampers, comparators etc.

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

CO 1	Analysis of Small Signal, Large Signal and Feedback amplifiers (Apply-L3)
CO 2	Design oscillators for different frequencies (Apply-L3)
CO 3	Analyze High pass, low pass RC circuits (Apply-L3)
CO 4	Apply passive filters for linear & Non-linear wave shaping (Apply-L3)

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

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

- T1** Jacob Millman, Christos C Halkias, "Electronic Devices and Circuits", Tata McGraw Hill, Publishers, New Delhi, Fourth reprint 2011
T2 J.Millman and H.Taub-"Pulse, Digital and Switching Waveforms"-McGraw-Hill, 1991

REFERENCE BOOKS:

- R1** R.L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits, Pearson Education Publishers, 10th Edition.
R2 S salivahanan, N.Suresh Kumar and A Vallavaraj, "Electronic Devices and Circuits", McGraw Hill 5th edition, 2010.
R3 T.F. Bogart Jr., J.S.Beasley and G.Rico, Electronic Devices and Circuits, Pearson Education edition, 2004.
R4 Anand Kumar-"Pulse and Digital Circuits"-PHI, 2005.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: TRANSISTOR AT HIGH FREQUENCIES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Amplifiers, CEOs, Cos and Applications	1	07-03-2022		TLM1	
2.	Amplifier analysis	1	09-03-2022		TLM1	
3.	Transistor at High Frequencies	1	10-03-2022		TLM1	
4.	The hybrid π Common Emitter Transistor model	1	14-03-2022		TLM1	
5.	Hybrid π conductance in terms of low frequency h parameters	1	16-03-2022		TLM1	
6.	Hybrid π conductance in terms of low frequency h parameters	1	17-03-2022		TLM2	
7.	TUTORIAL	1	19-03-2022		TLM3	
8.	Current gain with resistive load	1	21-03-2022		TLM1	
9.	The CE short circuit current gain (f_{β} and f_T parameters)	1	23-03-2022		TLM1	
10.	Assignment / Quiz/revision	1	24-03-2022		TLM3	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

UNIT-II: LARGE SIGNAL AMPLIFIERS

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.	Power Amplifiers: Classification of large signal Amplifiers	1	26-03-2022		TLM1	
2.	Distortion in amplifiers: second and higher order harmonic distortions	1	28-03-2022		TLM1	
3.	Class- A power amplifier- Direct coupled	1	30-03-2022		TLM1	
4.	Class- A power amplifier- Transformer Coupled	1	31-03-2022		TLM2	
5.	Class- A power amplifier- Transformer Coupled	1	04-04-2022		TLM3	
6.	Class- B Push Pull power amplifier	1	06-04-2022		TLM1	
7.	Class- B Complementary Symmetry power amplifier	1	07-04-2022		TLM1	
8.	TUTORIAL	1	09-04-2022		TLM2	
9.	Class-AB power amplifiers	1	11-04-2022		TLM3	
10.	Class- C, Class- D and Class- S power Amplifiers	1	13-04-2022		TLM1	
11.	Assignment / Quiz/ revision	1	16-04-2022		TLM6	
No. of classes required to complete UNIT-II: 11				No. of classes taken:		

UNIT-III: FEEDBACK AMPLIFIERS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Feedback Amplifiers and it's block diagram representation & Concept of negative and positive feedback	1	18-04-2022		TLM1	
2.	Classification of Negative Feedback Amplifiers	1	20-04-2022		TLM1	
3.	Voltage Series Feedback Amplifier (Block diagram and practical circuit analysis)	1	21-04-2022		TLM1	
4.	TUTORIAL-	1	23-04-2022		TLM1	
5.	Current series Feedback Amplifier (Block diagram and practical circuit analysis)	1	02-05-2022		TLM3	
6.	Voltage shunt and Current shunt feedback Amplifier (Block diagram & practical circuit analysis)	1	04-05-2022		TLM1	
7.	Frequency response of feedback amplifiers & Characteristics of Negative feedback Amplifiers	1	05-05-2022		TLM2	
8.	TUTORIAL-	1	07-05-2022		TLM3	
9.	Assignment / Quiz/ revision	1	09-05-2022		TLM6	
No. of classes required to complete UNIT-III: 9				No. of classes taken:		

UNIT-IV : OSCILLATORS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Oscillators and it's Classification and Barkhausen Criterion	1	11-05-2022		TLM1	
2.	General form of LC oscillator	1	12-05-2022		TLM1	
3.	Hartley, Colpitts and Clapp Oscillators	1	14-05-2022		TLM1	
4.	TUTORIAL-	1	16-05-2022		TLM3	
5.	RC phase shift oscillator using BJT	1	18-05-2022		TLM2	
6.	RC phase shift oscillator using FET	1	19-05-2022		TLM2	
7.	Wein Bridge Oscillator	1	21-05-2022		TLM2	
8.	TUTORIAL-	1	23-05-2022		TLM3	
9.	Crystal Oscillator	1	25-05-2022		TLM1	
10.	Frequency and Amplitude Stability of Oscillators	1	26-05-2022		TLM2	
11.	Assignment / Quiz/ revision	1	28-05-2022		TLM3	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V : LINEAR & NON-LINEAR WAVESHAPING

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.	RC circuit as a filter	1	30-05-2022		TLM1	
2.	RC Circuit as a Low Pass Filter and its response to sinusoidal, step and pulse inputs	1	01-06-2022		TLM1	
3.	Square wave and Ramp input to RC Low Pass Filter	1	02-06-2022		TLM1	
4.	TUTORIAL	1	04-06-2022		TLM3	
5.	RC Circuit as a High Pass Filter and its response to sinusoidal, step & pulse inputs	1	06-06-2022		TLM1	
6.	Square wave and Ramp input to RC High Pass Filter	1	08-06-2022		TLM3	
7.	Clipping at two independent levels, Zener diode clippers	1	09-06-2022		TLM1	
8.	TUTORIAL	1	11-06-2022		TLM3	
9.	Diode clippers, Transistor clippers, Comparators	1	13-06-2022		TLM1	
10.	Different clamper circuits, Clamping circuit theorem	1	15-06-2022		TLM1	
11.	BEYOND THE SYLLABUS: OP-AMP & Applications	1	16-06-2022		TLM2	
No. of classes required to complete UNIT-V: 11				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.
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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.
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PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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.
PSO4	Design controllers for electrical and electronic systems to improve their performance.

Course Instructor
(Mr.R.Anjaneyulu Naik)

Course Coordinator
(Mr.R.Anjaneyulu Naik)

Module Coordinator
(Dr.G.Nageswa Rao)

HOD
(Dr.J.S.V.PRASAD)



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING.

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. R.ANJANEYULU NAIK,
Course Name & Code : Analog Electronics - 20EE10
L-T-P Structure : 2-1-0 Credits : 3
Program/Sem/Sec : B.Tech., EEE., IV-Sem., Sections- B A.Y : 2021-22

PRE-REQUISITE: Electronic Circuits and Devices and Network Theory

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to analyze various electronic circuits like large signal amplifiers, feedback amplifiers, high pass, low pass RC circuits, clippers, clampers, comparators etc.

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

CO 1	Analysis of Small Signal, Large Signal and Feedback amplifiers (Apply-L3)
CO 2	Design oscillators for different frequencies (Apply-L3)
CO 3	Analyze High pass, low pass RC circuits (Apply-L3)
CO 4	Apply passive filters for linear & Non-linear wave shaping (Apply-L3)

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

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

- T1** Jacob Millman, Christos C Halkias, “Electronic Devices and Circuits”, Tata McGraw Hill, Publishers, New Delhi, Fourth reprint 2011
T2 J.Millman and H.Taub-“Pulse, Digital and Switching Waveforms”–McGraw-Hill, 1991

REFERENCE BOOKS:

- R1** R.L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits, Pearson Education Publishers, 10th Edition.
R2 S salivahanan, N.Suresh Kumar and A Vallavaraj, “Electronic Devices and Circuits”, McGraw Hill 5th edition, 2010.
R3 T.F. Bogart Jr., J.S.Beasley and G.Rico, Electronic Devices and Circuits, Pearson Education edition, 2004.
R4 Anand Kumar-“Pulse and Digital Circuits”-PHI, 2005.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: TRANSISTOR AT HIGH FREQUENCIES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Amplifiers, CEOs, Cos and Applications	1	08-03-2022		TLM1	
2.	Amplifier analysis	1	09-03-2022		TLM1	
3.	Transistor at High Frequencies	1	11-03-2022		TLM1	
4.	The hybrid π Common Emitter Transistor model	1	12-03-2022		TLM1	
5.	Hybrid π conductance in terms of low frequency h parameters	1	15-03-2022		TLM1	
6.	Hybrid π conductance in terms of low frequency h parameters	1	16-03-2022		TLM2	
7.	TUTORIAL	1	17-03-2022		TLM3	
8.	Current gain with resistive load	1	19-03-2022		TLM1	
9.	The CE short circuit current gain (f_{β} and f_T parameters)	1	23-03-2022		TLM1	
10.	Assignment / Quiz/revision	1	24-03-2022		TLM3	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

UNIT-II: LARGE SIGNAL AMPLIFIERS

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.	Power Amplifiers: Classification of large signal Amplifiers	1	29-03-2022		TLM1	
2.	Distortion in amplifiers: second and higher order harmonic distortions	1	30-03-2022		TLM1	
3.	Class- A power amplifier- Direct coupled	1	30-03-2022		TLM1	
4.	Class- A power amplifier- Transformer Coupled	1	31-03-2022		TLM2	
5.	Class- A power amplifier- Transformer Coupled	1	04-04-2022		TLM3	
6.	TUTORIAL	1	06-04-2022		TLM1	
7.	Class- B Complementary Symmetry power amplifier	1	07-04-2022		TLM1	
8.	Class- B Push Pull power amplifier	1	09-04-2022		TLM2	
9.	Class-AB power amplifiers	1	11-04-2022		TLM3	
10.	TUTORIAL	1	13-04-2022		TLM1	
11.	Class- C, Class- D and Class- S power Amplifiers . Assignment / Quiz/ revision	1	16-04-2022		TLM6	
No. of classes required to complete UNIT-II: 11				No. of classes taken:		

UNIT-III: FEEDBACK AMPLIFIERS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Feedback Amplifiers and it's block diagram representation & Concept of negative and positive feedback	1	19-04-2022		TLM1	
2.	Classification of Negative Feedback Amplifiers	1	20-04-2022		TLM1	
3.	Voltage Series Feedback Amplifier (Block diagram and practical circuit analysis)	1	21-04-2022		TLM1	
4.	TUTORIAL-	1	23-04-2022		TLM1	
5.	Current series Feedback Amplifier (Block diagram and practical circuit analysis)	1	04-05-2022		TLM3	
6.	Voltage shunt and Current shunt feedback Amplifier (Block diagram & practical circuit analysis)	1	06-05-2022		TLM1	
7.	Frequency response of feedback amplifiers & Characteristics of Negative feedback Amplifiers	1	07-05-2022		TLM2	
8.	TUTORIAL-	1	10-05-2022		TLM3	
9.	Assignment / Quiz/ revision	1	11-05-2022		TLM6	
No. of classes required to complete UNIT-III: 9				No. of classes taken:		

UNIT-IV : OSCILLATORS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Oscillators and it's Classification and Barkhausen Criterion	1	13-05-2022		TLM1	
2.	General form of LC oscillator	1	14-05-2022		TLM1	
3.	Hartley, Colpitts and Clapp Oscillators	1	17-05-2022		TLM1	
4.	TUTORIAL-	1	18-05-2022		TLM3	
5.	RC phase shift oscillator using BJT	1	20-05-2022		TLM2	
6.	RC phase shift oscillator using FET	1	21-05-2022		TLM2	
7.	Wein Bridge Oscillator	1	21-05-2022		TLM2	
8.	TUTORIAL-	1	24-05-2022		TLM3	
9.	Crystal Oscillator	1	25-05-2022		TLM1	
10.	Frequency and Amplitude Stability of Oscillators	1	27-05-2022		TLM2	
11.	Assignment / Quiz/ revision	1	28-05-2022		TLM3	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V : LINEAR & NON-LINEAR WAVESHAPING

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.	RC circuit as a filter	1	31-05-2022		TLM1	
2.	RC Circuit as a Low Pass Filter and its response to sinusoidal, step and pulse inputs	1	01-06-2022		TLM1	
3.	Square wave and Ramp input to RC Low Pass Filter	1	03-06-2022		TLM1	
4.	TUTORIAL	1	04-06-2022		TLM3	
5.	RC Circuit as a High Pass Filter and its response to sinusoidal, step & pulse inputs	1	07-06-2022		TLM1	
6.	Square wave and Ramp input to RC High Pass Filter	1	08-06-2022		TLM3	
7.	Clipping at two independent levels, Zener diode clippers	1	10-06-2022		TLM1	
8.	TUTORIAL	1	11-06-2022		TLM3	
9.	Diode clippers, Transistor clippers, Comparators	1	13-06-2022		TLM1	
10.	Different clamper circuits, Clamping circuit theorem	1	15-06-2022		TLM1	
11.	BEYOND THE SYLLABUS: OP-AMP & Applications	1	16-06-2022		TLM2	
No. of classes required to complete UNIT-V: 11				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	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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.
PSO4	Design controllers for electrical and electronic systems to improve their performance.

Course Instructor
(Mr.R.Anjaneyulu Naik)

Course Coordinator
(Mr.R.Anjaneyulu Naik)

Module Coordinator
(Dr.G.Nageswa Rao)

HOD
(Dr.J.S.V.PRASAD)



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.J.V.PAVAN CHAND

Course Name & Code : ELECTRICAL MACHINES-I –20EE11

L-T-P Structure : 2-1-0

Program/Sem/Sec : B.Tech/IV/A

Credits: 3

A.Y.: 2021-22

PREREQUISITE: Electric and magnetic fields

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to learn the principle, construction and performance characteristics of DC Machines and Transformers, methods of speed control of a DC motor and different connections of poly-phase transformers.

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

CO1	Understand the concepts of construction, operation and performance of dc generators. (Understand-L2)
CO2	Analyze the operation and performance of dc motors. (Understand-L2)
CO3	Evaluate the performance of single phase transformers. (Apply-L3)
CO4	Analyze the performance of three phase transformers. (Understand-L2)

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	2	2											2			3
CO2	2	2	2											2		2
CO3	2	2	2									1	2			2
CO4	2	2	2									2	2			2
			1 - Low					2 - Medium					3 - High			

TEXTBOOKS:

T1	P.S. Bimbira, "Electrical Machinery", Khanna Publishers, 7 th Edition, 2014.
T2	I.J.Nagrath&D.P.Kothari, "Electric Machines", Tata Mc Graw Hill, 7 th Edition.2004

REFERENCE BOOKS:

R1	M.G. Say, "Alternating Current Machines", John Wiley & Sons, 5 th edition, 2002.
R2	A. E. Fitzgerald, C. Kingsley, S. Umans, "Electric Machinery", Tata Mc Graw Hill, 7 th edition, 2013.
R3	Ashfaq Husain, "Electric Machines", Dhanapati Rai & Co, New Delhi, 2 nd edition, 2014.
R4	Clayton. A.E, "Performance and Design of Direct Current Machines" CBS Publishers, 1 st edition, 2004.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: D.C. GENERATORS

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	Construction of D.C. Generators	1	08-03-2022		TLM1	
2.	Principle of Operation of D.C. Generators & E.M.F Equation D.C. Generator	1	09-03-2022		TLM1	
3.	Types of D.C Generators	1	10-03-2022		TLM1	
4.	Armature reaction in D.C. Generator	1	14-03-2022		TLM1	
5.	Methods of reducing the effects of armature reaction- Compensating winding	1	15-03-2022		TLM1	
6.	Commutation	1	16-03-2022		TLM3	
7.	Tutorial-1	1	17-03-2022		TLM1	
8.	Methods of improving commutation	1	21-03-2022		TLM1	
9.	Losses in a dc machine-Power stages	1	22-03-2022		TLM1	
10.	Efficiency & Condition for maximum efficiency	1	23-03-2022		TLM3	
11.	Problems	1	24-03-2022		TLM1	
12.	Tutorial-2		28-03-2022		TLM1	
No. of classes required to complete UNIT-I: 12				No. of classes taken:		

UNIT-II: CHARACTERISTICS OF DC GENERATORS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	O.C.C-Voltage build up in generators- Critical field resistance and critical speed	1	29-03-2022		TLM1	
14.	Causes for failure to self excite and Remedial measures	1	30-03-2022		TLM1	
15.	Load characteristics of shunt Generator	1	31-04-2022		TLM1	
16.	Load characteristics of series Generator	1	04-04-2022		TLM1	
17.	Tutorial-3	1	05-04-2022		TLM3	
18.	Load characteristics of compound Generator	1	06-04-2022		TLM1	
No. of classes required to complete UNIT-II: 06				No. of classes taken:		

UNIT-III: D.C MOTORS

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.	Principle of operation of D.C. Motor	1	07-04-2022		TLM1	
20.	Back E.M.F. equation and Torque equation of D.C. Motor	1	11-04-2022		TLM1	
21.	Characteristics and application of shunt, series and compound motors	1	12-04-2022		TLM1	
22.	Armature reaction and commutation in D.C Motor	1	13-04-2022		TLM1	
23.	Speed control methods	1	14-04-2022		TLM1	
24.	Tutorial-4	1	18-04-2022		TLM3	
25.	Starters-3 point and 4 point starters	1	19-04-2022		TLM1	
26.	Constant and Variable losses, calculation of efficiency & condition for maximum efficiency	1	20-04-2022		TLM1	

27.	Brake test on DC Motor	1	21-04-2022		TLM1	
28.	Tutorial-5	1	02-05-2022		TLM3	
29.	Swinburne's test	1	03-05-2022		TLM1	
30.	Hopkinson's test	1	04-05-2022		TLM1	
31.	Retardation Test	1	05-05-2022		TLM1	
No. of classes required to complete UNIT-III: 13				No. of classes taken:		

UNIT-IV:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Constructional details of Transformer-core, windings, insulation, bushings & cooling	1	09-05-2022		TLM1	
33.	Types of transformers	1	10-05-2022		TLM1	
34.	Emf equation of transformer - operation of transformer on no-load and on-load	1	11-05-2022		TLM1	
35.	Phasor diagrams of transformer - Equivalent circuit of transformer	1	12-05-2022		TLM1	
36.	Tutorial-6	1	16-05-2022		TLM3	
37.	Losses, efficiency and regulation.	1	17-05-2022		TLM1	
38.	All day efficiency-effect of frequency & supply voltage on core losses	1	18-05-2022		TLM1	
39.	Minimization of hysteresis and eddy current losses	1	19-05-2022		TLM1	
40.	Parallel operation with equal and unequal voltage	1	23-05-2022		TLM1	
41.	Testing- O.C and S.C tests	1	24-05-2022		TLM1	
42.	Sumpner's (back to back) test - predetermination of efficiency and regulation	1	25-05-2022		TLM1	
43.	Sumpner's (back to back) test - predetermination of efficiency and regulation	1	26-05-2022			
44.	Tutorial-7	1	30-05-2022			
45.	Separation of losses & load test on transformer	1	31-05-2022		TLM1	
46.	Separation of losses & load test on transformer	1	01-06-2022		TLM3	
No. of classes required to complete UNIT-IV: 13				No. of classes taken:		

UNIT-V:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
47.	Auto transformers- comparison with two winding transformers	1	02-06-2022		TLM1	
48.	Tutorial-8	1	06-06-2022		TLM1	
49.	Poly-phase transformers & Poly-phase connections - Y/Y, Y/ Δ	1	07-06-2022		TLM1	
50.	Poly-phase connections - Δ /Y, Δ / Δ	1	08-06-2022		TLM3	
51.	Poly-phase transformers & Poly-phase connections - Y/Y, Y/ Δ	1	09-06-2022		TLM1	
52.	Poly-phase connections - Δ /Y, Δ / Δ	1	13-06-2022		TLM1	
53.	open Δ -Scott connection	1	14-06-2022		TLM1	
54.	three winding transformers-	1	15-06-2022			

	tertiary windings				
55.	off load and on load tap changing	2	16-06-2022		
56.	Content beyond syllabus	1	16-06-2022		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 (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.J.V.PAVAN CHAND	Mr.J.V.PAVAN CHAND	Mr.P.Deepak Reddy	Dr.J.SIVAVARA PRASAD
Signature				



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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. K.NAGALINGA CHARY

Course Name & Code : ELECTRICAL MACHINES-I –20EE11

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

Credits: 3

Program/Sem/Sec : B.Tech/IV/B

A.Y.: 2021-22

PREREQUISITE: Electric and magnetic fields

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course enables the student to learn the principle, construction and performance characteristics of DC Machines and Transformers, methods of speed control of a DC motor and different connections of poly-phase transformers.

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

CO1	Understand the concepts of construction, operation and performance of dc generators. (Understand-L2)
CO2	Analyze the operation and performance of dc motors. (Understand-L2)
CO3	Evaluate the performance of single phase transformers. (Apply-L3)
CO4	Analyze the performance of three phase transformers. (Understand-L2)

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	2	2											2			3
CO2	2	2	2											2		2
CO3	2	2	2									1	2			2
CO4	2	2	2									2	2			2
			1 - Low					2 - Medium					3 - High			

TEXTBOOKS:

T1	P.S. Bimbira, "Electrical Machinery", Khanna Publishers, 7 th Edition, 2014.
T2	I.J.Nagrath&D.P.Kothari, "Electric Machines", Tata Mc Graw Hill, 7 th Edition.2004

REFERENCE BOOKS:

R1	M.G. Say, "Alternating Current Machines", John Wiley & Sons, 5 th edition, 2002.
R2	A. E. Fitzgerald, C. Kingsley, S. Umans, "Electric Machinery", Tata Mc Graw Hill, 7 th edition, 2013.
R3	Ashfaq Husain, "Electric Machines", Dhanapati Rai & Co, New Delhi, 2 nd edition, 2014.
R4	Clayton. A.E, "Performance and Design of Direct Current Machines" CBS Publishers, 1 st edition, 2004.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: D.C. GENERATORS

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	Construction of D.C. Generators	1	09-03-2022		TLM1	
2.	Principle of Operation of D.C. Generators & E.M.F Equation D.C. Generator	1	11-03-2022		TLM1	
3.	Types of D.C Generators	1	12-03-2022		TLM1	
4.	Armature reaction in D.C. Generator	1	14-03-2022		TLM1	
5.	Methods of reducing the effects of armature reaction- Compensating winding	1	16-03-2022		TLM1	
6.	Tutorial-1	1	19-03-2022		TLM3	
7.	Commutation	1	21-03-2022		TLM1	
8.	Methods of improving commutation	1	23-03-2022		TLM1	
9.	Losses in a dc machine-Power stages	1	25-03-2022		TLM1	
10.	Tutorial-2	1	26-03-2022		TLM3	
11.	Efficiency & Condition for maximum efficiency	1	28-03-2022		TLM1	
12.	Problems		30-03-2022		TLM1	
No. of classes required to complete UNIT-I: 12				No. of classes taken:		

UNIT-II: CHARACTERISTICS OF DC GENERATORS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	O.C.C-Voltage build up in generators- Critical field resistance and critical speed	1	01-04-2022		TLM1	
14.	Causes for failure to self excite and Remedial measures	1	04-04-2022		TLM1	
15.	Load characteristics of shunt Generator	1	06-04-2022		TLM1	
16.	Load characteristics of series Generator	1	08-04-2022		TLM1	
17.	Tutorial-3	1	09-04-2022		TLM3	
18.	Load characteristics of compound Generator	1	11-04-2022		TLM1	
No. of classes required to complete UNIT-II: 06				No. of classes taken:		

UNIT-III: D.C MOTORS

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.	Principle of operation of D.C. Motor	1	13-04-2022		TLM1	
20.	Back E.M.F. equation and Torque equation of D.C. Motor	1	16-04-2022		TLM1	
21.	Characteristics and application of shunt, series and compound motors	1	18-04-2022		TLM1	
22.	Armature reaction and commutation in D.C Motor	1	20-04-2022		TLM1	
23.	Speed control methods	1	22-04-2022		TLM1	
24.	Tutorial-4	1	23-04-2022		TLM3	
25.	Starters-3 point and 4 point starters	1	02-05-2022		TLM1	
26.	Constant and Variable losses, calculation of efficiency & condition for maximum efficiency	1	04-05-2022		TLM1	

27.	Brake test on DC Motor	1	06-05-2022		TLM1
28.	Tutorial-5	1	07-05-2022		TLM3
29.	Swinburne's test	1	09-05-2022		TLM1
30.	Hopkinson's test	1	11-05-2022		TLM1
31.	Retardation Test	1	13-05-2022		TLM1
No. of classes required to complete UNIT-III: 13				No. of classes taken:	

UNIT-IV:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Constructional details of Transformer-core, windings, insulation, bushings & cooling	1	14-05-2022		TLM1	
33.	Types of transformers	1	16-05-2022		TLM1	
34.	Emf equation of transformer - operation of transformer on no-load and on-load	1	18-05-2022		TLM1	
35.	Phasor diagrams of transformer - Equivalent circuit of transformer	1	20-05-2022		TLM1	
36.	Tutorial-6	1	21-05-2022		TLM3	
37.	Losses, efficiency and regulation.	1	23-05-2022		TLM1	
38.	All day efficiency-effect of frequency & supply voltage on core losses	1	25-05-2022		TLM1	
39.	Minimization of hysteresis and eddy current losses	1	27-05-2022		TLM1	
40.	Parallel operation with equal and unequal voltage	1	28-05-2022		TLM1	
41.	Testing- O.C and S.C tests	1	30-05-2022		TLM1	
42.	Sumpner's (back to back) test - predetermination of efficiency and regulation	1	01-06-2022		TLM1	
43.	Separation of losses & load test on transformer	1	03-06-2022		TLM1	
44.	Tutorial-7	1	04-06-2022		TLM3	
No. of classes required to complete UNIT-IV: 13				No. of classes taken:		

UNIT-V:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Auto transformers- comparison with two winding transformers	1	06-06-2022		TLM1	
46.	Poly-phase transformers & Poly-phase connections - Y/Y, Y/ Δ	1	08-06-2022		TLM1	
47.	Poly-phase connections - Δ /Y, Δ / Δ	1	10-06-2022		TLM1	
48.	Tutorial-8	1	11-06-2022		TLM3	
49.	open Δ -Scott connection	1	13-06-2022		TLM1	
50.	three winding transformers- tertiary windings	1	15-06-2022		TLM1	
51.	off load and on load tap changing	1	17-06-2022		TLM1	
52.	Content beyond syllabus	1	18-06-2022		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 (R20 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.K.NAGALINGA CHARY	Mr.J.V.PAVAN CHAND		Dr.J.SIVAVARA PRASAD
Signature				



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

Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. A.V. RAVI KUMAR / Dr. M.S.GIRIDHAR/ Ms I.D.S.SREE

Course Name & Code : ANALOG ELECTRONICS LAB & 20EE56

L-T-P Structure : 0-0-2

Credits: 1

Program/Sem/Sec : B.Tech/IV/A

A.Y.: 2021-22

Pre requisite: Electronic Circuits and Devices and Analog Electronics.

Course Educational Objective: This course provides the practical exposure on designing of different single stage and multistage stage amplifiers, effect of capacitances on frequency response, analysis of power and feedback amplifiers.

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

CO1	Demonstrate the characteristics of Amplifiers, Oscillators, feedback amplifiers, and Multivibrators.(Apply-L3)
CO2	Analyze Timer circuits and its applications.(Apply-L3)
CO3	Design of feedback amplifiers, Power amplifiers and waveform generators using Electronic devices and components.(Apply-L3)

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

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

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

DAY : TUESDAY

Batches : 20761A0237 – 63, 21765A0201 TO 207

B.NO.	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	INTERNAL EXAM
	Tentative date	08/3	15/3	22/3	29/3	12/4	19/4	10/5	17/5	24/5	31/5	07/6	14/6	
	Actual date													
B-1	20761A0237 20761A0238 20761A0239 20761A0240	DEMO	1	2	3	4	5	6	7	8	9	10		
B-2	20761A0241 20761A0242 20761A0243 20761A0244	DEMO	1	2	3	4	5	6	7	8	9	10		
B-3	20761A0245 20761A0246 20761A0247 20761A0248	DEMO	1	2	3	4	5	6	7	8	9	10		
B-4	20761A0249 20761A0250 20761A0251 20761A0252	DEMO	1	2	3	4	5	6	7	8	9	10		
B-5	20761A0253 20761A0254 20761A0255	DEMO	1	2	3	4	5	6	7	8	9	10		
B-6	20761A0256 20761A0257 20761A0258	DEMO	1	2	3	4	5	6	7	8	9	10		
B-7	20761A0259 20761A0260 20761A0261	DEMO	1	2	3	4	5	6	7	8	9	10		
B-8	20761A0262 20761A0263 21765A0201	DEMO	1	2	3	4	5	6	7	8	9	10		
B-9	21765A0202 21765A0203 21765A0204	DEMO	1	2	3	4	5	6	7	8	9	10		
B-10	21765A0205 21765A0206 21765A0207	DEMO	1	2	3	4	5	6	7	8	9	10		

DAY : SATURDAY

Batches : 20761A0201 - 236

B.NO.	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	INTERNAL EXAM
	Tentative date	19/3	26/3	09/4	16/4	23/4	07/5	14/5	21/5	28/5	04/6	11/6	18/6	
	Actual date													
B-1	20761A0201 20761A0202 20761A0203 20761A0204	DEMO	1	2	3	4	5	6	7	8	9	10		
B-2	20761A0205 20761A0206 20761A0207 20761A0208	DEMO	1	2	3	4	5	6	7	8	9	10		
B-3	20761A0209 20761A0210 20761A0211 21765A0212	DEMO	1	2	3	4	5	6	7	8	9	10		
B-4	20761A0213 20761A0214 20761A0215 21765A0216	DEMO	1	2	3	4	5	6	7	8	9	10		
B-5	20761A0217 20761A0218 20761A0219 21765A0220	DEMO	1	2	3	4	5	6	7	8	9	10		
B-6	20761A0221 20761A0222 20761A0223	DEMO	1	2	3	4	5	6	7	8	9	10		
B-7	20761A0224 20761A0225 20761A0226	DEMO	1	2	3	4	5	6	7	8	9	10		
B-8	20761A0227 20761A0229 20761A0230	DEMO	1	2	3	4	5	6	7	8	9	10		
B-9	20761A0231 20761A0232 20761A0233	DEMO	1	2	3	4	5	6	7	8	9	10		
B-10	20761A0234 20761A0235 20761A0236	DEMO	1	2	3	4	5	6	7	8	9	10		

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	Marks
Day – Day Evaluation	A=05
Record	B=05
Internal Exam	C=05
Cumulative Internal Examination (CIE) : A+B+C	15
Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

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):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and 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
PSO4	Design controllers for electrical and electronic systems to improve their performance.

Mr.A.V.RAVIKUMAR Dr. M.S.GIRIDHAR Ms I D SATYA SREE	Dr. M.S.GIRIDHAR	Dr A V G A MARTHANDA	Dr.J.S.V.PRASAD
Course Instructor	Course Coordinator	Module Coordinator	HOD



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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.CH.RAJESH/ Smt.T.NAGA DURGA

Course Name & Code : ANALOG ELECTRONICS LAB-20EE56

L-T-P Structure : 0-0-2

Credits: 1

Program/Sem/Sec : B.Tech/IV/B

A.Y.:2021-22

PRE-REQUISITES : Electronic Circuits and Devices and Analog Electronics

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course provides the practical exposure on designing of different single stage and multistage stage amplifiers, effect of capacitances on frequency response, analysis of power and feedback amplifiers.

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

CO1	Demonstrate the characteristics of Amplifiers, Oscillators, feedback amplifiers, and Multivibrators.(Apply-L3)
CO2	Analyze Timer circuits and its applications.(Apply-L3)
CO3	Design of feedback amplifiers, Power amplifiers and waveform generators using Electronic devices and components.(Apply-L3)

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	2	2	2	2	2			2	2	2			2			3
CO2	2	2	2	2	2			2	2	2				2		2
CO3	2	2	2	2	2			2	2	2			2			2
			1 - Low				2 -Medium				3 - High					

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

DAY : THURSDAY

Batches : 20761A0264-299

B.NO.	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	08/03	15/03	22/03	29/03	05/04	12/04	19/04	10/05	17/05	24/05	31/05	07/06	14/06
	Actual date													
B-1	20761A0264 20761A0274 20761A0284 20761A0294	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	20761A0265 20761A0275 20761A0285 20761A0295	DEMO	1	2	3	4	5	6	7	8	9	10		
B-3	20761A0266 20761A0276 20761A0286 20761A0296	DEMO	1	2	3	4	5	6	7	8	9	10		
B-4	20761A0267 20761A0277 20761A0287 20761A0297	DEMO	1	2	3	4	5	6	7	8	9	10		
B-5	20761A0268 20761A0278 20761A0288	DEMO	1	2	3	4	5	6	7	8	9	10		
B-6	20761A0269 20761A0279 20761A0289	DEMO	1	2	3	4	5	6	7	8	9	10		
B-7	20761A0270 20761A0280 20761A0290	DEMO	1	2	3	4	5	6	7	8	9	10		
B-8	20761A0271 20761A0291 20761A0298	DEMO	1	2	3	4	5	6	7	8	9	10		
B-9	20761A0282 20761A0292 20761A0299	DEMO	1	2	3	4	5	6	7	8	9	10		
B-10	20761A0273 20761A0283 20761A0293	DEMO	1	2	3	4	5	6	7	8	9	10		

DAY : TUESDAY

Batches : 20761A02A0 – 2C3 & 20765A0208 -- 20765A0217

B.NO.	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	IX Week
	Tentative date	10/03	17/03	24/03	31/03	07/04	14/04	21/04	05/05	12/05	19/05	26/05	02/06	09/06	16/06
	Actual date														
B-1	20761A02A0 20761A02B0 20761A02C0 20765A0208	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	20761A02A1 20761A02B1 20761A02C1 20765A0209	DEMO	1	2	3	4	5	6	7	8	9	10			
B-3	20761A02A2 20761A02B2 20761A02C2 20765A0210	DEMO	1	2	3	4	5	6	7	8	9	10			
B-4	20761A02A3 20761A02B3 20761A02C3 20765A0211	DEMO	1	2	3	4	5	6	7	8	9	10			
B-5	20761A02A4 20761A02B4 20765A0212	DEMO	1	2	3	4	5	6	7	8	9	10			
B-6	20761A02A5 20761A02B5 20765A0213	DEMO	1	2	3	4	5	6	7	8	9	10			
B-7	20761A02A6 20761A02B6 20765A0214	DEMO	1	2	3	4	5	6	7	8	9	10			
B-8	20761A02A7 20761A02B7 20765A0215	DEMO	1	2	3	4	5	6	7	8	9	10			
B-9	20761A02A8 20761A02B8 20765A0216	DEMO	1	2	3	4	5	6	7	8	9	10			
B-10	20761A02A9 20761A02B9 20765A0217	DEMO	1	2	3	4	5	6	7	8	9	10			

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	Marks
Day – Day Evaluation	A=05
Record	B=05
Internal Exam	C=05
Cumulative Internal Examination (CIE) : A+B+C	15
Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

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):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
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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
PSO4	Design controllers for electrical and electronic systems to improve their performance.

Mr.Ch.Rajesh smt.T.Naga Durga	Dr.M.S.Giridhar.		Dr.J.Sivavara Prasad
Course Instructor	Course Coordinator	Module Coordinator	HOD

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

DAY : TUESDAY

Batches : 20761A0201-236

B.NO.	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	08/03	15/03	22/03	29/03	05/04	12/04	19/04	10/05	17/05	24/05	31/05	07/06	14/06
	Actual date													
B-1	20761A0201 20761A0202 20761A0203 20761A0204	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	20761A0205 20761A0206 20761A0207 20761A0208	DEMO	1	2	3	4	5	6	7	8	9	10		
B-3	20761A0209 20761A0210 20761A0211 20761A0212	DEMO	1	2	3	4	5	6	7	8	9	10		
B-4	20761A0213 20761A0214 20761A0215 20761A0216	DEMO	1	2	3	4	5	6	7	8	9	10		
B-5	20761A0217 20761A0218 20761A0219	DEMO	1	2	3	4	5	6	7	8	9	10		
B-6	20761A0220 20761A0221 20761A0222	DEMO	1	2	3	4	5	6	7	8	9	10		
B-7	20761A0223 20761A0224 20761A0225	DEMO	1	2	3	4	5	6	7	8	9	10		
B-8	20761A0226 20761A0227 20761A0229	DEMO	1	2	3	4	5	6	7	8	9	10		
B-9	20761A0230 20761A0231 20761A0232	DEMO	1	2	3	4	5	6	7	8	9	10		
B-10	20761A0233 20761A0234 20761A0235 20761A0236	DEMO	1	2	3	4	5	6	7	8	9	10		

DAY : Saturday

Batches : 20761A0237 – 263& 20765A0201 -- 20765A0207

B.NO.	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	IX Week
	Tentative date	12/03	19/03	26/03	09/04	16/04	23/04	07/05	14/05	21/05	28/05	04/06	11/06	18/06
	Actual date													
B-1	20761A0237 20761A0238 20761A0239 20765A0240	DEMO	1	2	3	4	5	6	7	8	9	10	REVISION OF EXPERIMENTS	INTERNAL EXAM
B-2	20761A0241 20761A0242 20761A0243 20765A0244	DEMO	1	2	3	4	5	6	7	8	9	10		
B-3	20761A0245 20761A0246 20761A0247 20765A0248	DEMO	1	2	3	4	5	6	7	8	9	10		
B-4	20761A0249 20761A0250 20761A0251 20765A0252	DEMO	1	2	3	4	5	6	7	8	9	10		
B-5	20761A0253 20761A0254 20765A0255	DEMO	1	2	3	4	5	6	7	8	9	10		
B-6	20761A0256 20761A0257 20765A0258	DEMO	1	2	3	4	5	6	7	8	9	10		
B-7	20761A0259 20761A0260 20765A0261	DEMO	1	2	3	4	5	6	7	8	9	10		
B-8	20761A0262 20761A0263 20765A0201	DEMO	1	2	3	4	5	6	7	8	9	10		
B-9	20765A0202 20765A0203 20765A0204	DEMO	1	2	3	4	5	6	7	8	9	10		
B-10	20761A0205 20761A0206 20765A0207	DEMO	1	2	3	4	5	6	7	8	9	10		

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	Marks
Day – Day Evaluation	A=05
Record	B=05
Internal Exam	C=05
Cumulative Internal Examination (CIE) : A+B+C	15
Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

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):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
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Mr.Imran Abdul, Mrs.K.S.LLavnya,MrsR.Padma Dr.G.nageswara Rao	Dr.G.Nageswara Rao		Dr.J.Sivavara Prasad
Course Instructor	Course Coordinator	Module Coordinator	HOD

