LESSON PLAN

Course Code	Course Title	Year/Sem	Branch	Contact Hrs/Week	Section
R20	ELECTRICAL CIRCUIT ANALYSIS - II	II/I	EEE	6	EEE

COURSE OBJECTIVES:

1. To study the concepts of passive elements, types of sources and various network reduction techniques.
2. To understand the applications of network topology to electrical circuits.
3. To study the concept of magnetic coupled circuit.
4. To understand the behavior of RLC networks for sinusoidal excitations.
5. To study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.
6. To understand the applications of network theorems for analysis of electrical networks.

Unit No.	Out Comes	TOPIC(S)		BOOK Reference	Total periods	Delivery Method	GATE / IES
	UNIT I - Balanced and Unbalanced Three phase circuits						
1	CO1: To know the characteristics of various power semiconductor.	1.1	**Analysis of three phase balanced circuits**	**T1**	**14**	Chalk & Talk, PPT, Active Learning, Smart board & Tutorial	
		1.2	Phase sequence, star and delta connection of sources and loads	**T1**			
		1.3	Phase sequence, star and delta connection of sources and loads	**T1**			
		1.4	Relation between line and phase voltages and currents	**T1**			
		1.5	Analysis of balanced three phase circuits	**T1**			
		1.6	Measurement of active and reactive power	**T1**			
		1.7	**Analysis of three phase unbalanced circuits**	**T1**			
		1.8	Loop method	**T1**			
		1.9	Star-Delta transformation technique	**T1**			

		1.10	Two-wattmeter method for measurement of three phase power.	**T1**			
		1.11	Two-wattmeter method for measurement of three phase power.	**T1**			
		1.12	Numerical problems	**T1**			
		1.13	Numerical problems	**T1**			
		1.14	Numerical problems	**T1**			
	UNIT II - Transient Analysis in DC Circuits						
2	CO2: To learn the operation of single phase full–wave converters and perform harmonic analysis of input current.	2.1	Transient response of First order (R-L, R-C) using differential equations	**T1**	**11**	Chalk & Talk, PPT Tutorial, Active Learning Smart board &Case Study	
		2.2	Transient response of First order (R-L, R-C) using differential equations	**R2**			
		2.3	Transient response of second order (R-L-C) circuits using differential equations	**T1**			
		2.4	Transient response of second order (R-L-C) circuits using differential equations	**T1**			
		2.5	Transient response of First order (R-L, R-C) using Laplace transforms	**R2**			
		2.6	Transient response of First order (R-L, R-C) using Laplace transforms				
		2.7	Transient response of second order (R-L-C) circuits using Laplace transforms	**R2**			
		2.8	Transient response of second order (R-L-C) circuits using Laplace transforms	**T1**			
		2.9	Numerical problems	**T1**			
		2.10	Numerical problems	**T1**			
		2.11	Numerical problems	**T2**			
	UNIT III – Transient Analysis in AC circuits						
3	CO3: To learn the operation of three phase full–wave converters and AC/AC	3.1	Transient response of First order (R-L, R-C) using differential equations	**T1**	**11**	Chalk & Talk, PPT, Smart board‘ Lab, Tutori	
		3.2	Transient response of First order (R-L, R-C) using differential equations	**T1**			
		3.3	Transient response of second order (R-L-C) circuits using differential equations	**T1**			

		3.4	Transient response of second order (R-L-C) circuits using differential equations	**T2**		al	
		3.5	Transient response of First order (R-L, R-C) using Laplace transforms	**T2**			
		3.6	Transient response of First order (R-L, R-C) using Laplace transforms				
		3.7	Transient response of second order (R-L-C) circuits using Laplace transforms	**T2**			
		3.8	Transient response of second order (R-L-C) circuits using Laplace transforms	**T1**			
		3.9	Numerical problems	**T1**			
		3.10	Numerical problems	**T1**			
		3.11	Numerical problems	**T1**			
	UNIT IV- Two Port Networks						
4	CO4: To learn the operation of different types of DC-DC converters.	4.1	Two port network parameters – Z, Y, ABCD	**T2**	**8**	Chalk & Talk, PPT, Active Learning, Smart board & Tutorial	
		4.2	Two port network parameters – Z, Y, ABCD	**T1**			
		4.3	Two port network parameters – Z, Y, ABCD				
		4.4	Hybrid parameters and their relations	**R3**			
		4.5	Hybrid parameters and their relations	**T2**			
		4.6	Cascaded networks	**T2**			
		4.7	Numerical problems	**T2**			
		4.8	Numerical problems				
	UNIT V - Filters						
5	CO5: To learn the operation of PWM inverters for voltage control and harmonic mitigation.	5.1	Need of Filters	**T1, T2**	**10**	Chalk & Talk, PPT Tutorial, Active Learning & Seminars	
		5.2	Classification	**T1, T2**			
		5.3	Characteristic impedance	**T2**			
		5.4	Low Pass Filter	**T2**			
		5.5	High Pass Filter	**T2**			
		5.6	Band Pass Filter	**T2**			
		5.7	Band Stop or Band Elimination Filter	**T2**			
		5.8	m-Derived Filter	**T2**			
		5.9	Composite filters	**T2**			
		5.10	Design of Filters	**T2**			
		TOTAL			**54**		

Course Outcomes:

At the end of the course, student will be able to

CO1	Understand the concepts of balanced and unbalanced three-phase circuits.	UNDERSTAND	K2
CO2	Know the transient behavior of electrical networks with DC excitations.	UNDERSTAND	K2
CO3	Learn the transient behavior of electrical networks with AC excitations.	REMEMBER	K1
CO4	Estimate various parameters of a two port network.	UNDERSTAND	K2
CO5	Understand the significance of filters in electrical networks.	UNDERSTAND	K2

CO-PO MAPPING: **(**1: Slight [Low]; 2: Moderate [Medium]; 3: Substantial [High]]; '-': No Correlation**)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1-K2	3	3	3	3	2	3	2	-	3	-	3	3
CO2-K2	3	3	3	2	2	2	2	-	3	-	3	3
CO3-K1	3	3	3	3	2	2	3	-	3	-	3	2
CO4-K2	3	3	3	3	2	3	2	-	2	-	2	3
CO5-K2	3	3	3	3	2	2	3	-	3	-	3	2

S.NO	GRADUATE ATTRIBUTION	ACTION VERBS	LEVEL
1	ENGINEERING KNOWLEDGE	APPLY	K3
2	PROBLEM ANALYSIS	APPLY	K3
3	DESIGN DEVELOPMENT OF SOLUTIONS	UNDERSTAND	K2
4	INVESTIGATION OF COMPLEX PROBLEMS	APPLY	K3
5	MODERN TOOL USAGE	APPLY	K3
6	ENGINEER AND SOCIETY	UNDERSTAND	K2
7	ENVIRONMENT AND SUSTAINABILITY	UNDERSTAND	K2
8	ETHICS		
9	INDIVIDUALS AND TEAM WORK	UNDERSTAND	K2
10	COMMUNICATION		
11	PROJECT MANAGEMENT AND FINANCE	APPLY	K3
12	LIFE LONG LEARNING	APPLY	K3

Text Books:	
S.No.	**AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION**
1.	Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, McGraw Hill Company,9thedition, 2018.
2.	Network analysis: Van Valkenburg: Prentice-Hall of India Private Ltd, 3rd edition, 2019.
Reference Books:	
S.No.	**AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION**
1.	Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India), 6th edition, 2019.
2.	Introduction to circuit analysis and design by Tildon H Glisson. Jr, Springer Publications, 1st edition, 2011.

3.	Circuits by A.Bruce Carlson, Cengage Learning Publications, 1st edition, 2008.
4.	Network Theory Analysis and Synthesis by SmarajitGhosh, PHI publications, ninth print, 2015.
5.	Networks and Systems by D. Roy Choudhury, New Age International publishers, 2nd edition, 2013.
6.	Electric circuit by Joseph Edminister, Schaum's outlines series, seventh edition, 2017.
7.	Electric Circuits by David A. Bell, Oxford publications, 7th edition, 2009.
8.	Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi, DhanpatRai&Co, 7th - Revised edition, 2018)

		Name	Signature with Date
i.	Faculty	**Siyyadri Jyothi Rani**	
ii.	Course Coordinator		

HOD **PRINCIPAL**