

Branch Name:	Electrical Engineering
Program Code	ET403
Course Name:	A.C. CIRCUITS
Course Code:	2ET4030301
Pre-requisiteCourse:	

COURSE OBJECTIVE:

1. To Interpret various terminologies, waveform and vector representation of alternating quantities.
2. To Apply principles of A.C. series circuits to solve electrical circuits.
3. To Apply principles of A.C. parallel circuits to solve electrical circuits
4. To Apply principles of three phase circuits to solve electrical circuits.

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment
3	1	2	5	60	40	20	30

DETAILS OF COURSE CONTENTS:

SrNo	Topics and Sub-topics	Total Hours	% Weightage
1	A.C Fundamentals 1.1 Advantages of AC system over DC system 1.2 Principle of generating an alternating voltage 1.3 Terms related to alternating current 1.4 Vector representation of alternating quantities, 1.5 Mathematical representation of an Alternating Quantity or Vector 1.6 Mathematical Operation of Vectors 1.7 Numerical based on A.C Fundamental	10	20

2	A.CSERIES CIRCUITS 2.1 Waveforms, phasor diagram and expression of voltage, current and power in pure: Resistance, Inductance, Capacitance 2.2 AC through RL, RC, RLC series circuit 2.3 Impedance Triangle and Quality Factor. 2.4 R-L-C Series Resonance and resonant frequency 2.5 Different Powers in A.C series circuits 2.6 Lagging, Leading and Unity Power factor 2.7 Causes & disadvantages of low power factor and advantages of improvement in power factor 2.8 Numerical based on series circuits.	12	30
3	A.C PARALLEL CIRCUITS 3.1 Solution of AC parallel circuits using phasor method. 3.2 Solution of AC parallel circuits using admittance method. 3.3 Parallel Resonance and Resonant frequency 3.4 Numerical based on AC parallel circuits	08	25
4	POLYPHASE CIRCUITS 4.1 Principle of generation of three phase alternating voltage. 4.2 Single and three phase circuits 4.3 Line and phase voltage, line and phase current 4.4 Three-phase star connection 4.5 Three-phase delta connection	08	25
5	APPLICATION OF A.C CIRCUITS 5.1 Application of A.C Series Circuit 5.2 Application Of A.C Parallel Circuits 5.3 Application Of Polyphase Circuits	04	10

REFERENCE BOOKS:

1. B.L. Thereja, Electrical Technology, Volume-1
2. J.B. Gupta, Fundamentals of Electrical Engineering
3. U.A. Patel, Elements of Electrical & Electronics Engineering.

LIST OF PRACTICAL:

1	Measure Voltage, current and power through pure resistance.
2	Measurement of inductance and resistance of choke coil
3	Measure voltage, current, power and power factor in a series RL circuit with relevant Phasor diagram.
4	Measure voltage, current, power and power factor in a series RC circuit with relevant Phasor diagram.
5	Measure voltage, current, power and power factor in a series RLC circuit with relevant Phasor diagram.
6	Measure voltage, current, power and power factor in a RL parallel circuit with relevant Phasor diagram.



7	Measure voltage, current, power and power factor in a RC parallel circuit with relevant Phasor diagram.
8	Measure voltage, current, power and power factor in a RL C parallel circuit with Relevant phasor diagram.
9	Measure voltage, current, power and power factor for combined series-parallel circuits
10	Measure resonance frequency and resonant impedance in RL C series circuit.
11	Test voltage and current relation for 3 phase star and delta connections.
12	Measure active and reactive power of three phase circuits.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Discuss the knowledge on fundamentals of A.C circuits	2 Understanding
CLO2	List the various experimental studies about A.C.system	1 Remembering
CLO3	Analyze & solve the Different A.C. Circuits problems	5,3, 4 Evaluate, Applying Analyze
CLO4	Discuss & Able to understand all the fundamentals terminology related to A.C.	2 Understanding
CLO5	Able to understand rules related to A.C.Circuits.	5,3, 4 Evaluate, Applying, Analyze
CLO6	Understand Importance of Three phase connections & power factor	2 Understanding 1 Remembering

Mapping of CLOs with Pos & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	H	H			M	L		L	M	L		L	H	L	L
CLO2	H	H			M				L				H	M	L
CLO3	H	H	M			L						L	L		M
CLO4	H	H	M		L			L					M		M
CLO5	H	H	M		L					L			M		
CLO6	H	H	M				L						L	L	

H:High, M:Medium, L:Low

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Faculty of Engineering and Technology
Diploma Engineering Semester- III
In Effect from Academic Year 2023-24