

Course name : Electrical Engineering Group.

Course Code : EE/EP

Semester : Third

Subject Title : Electrical Circuits & Network

Subject Code : 9031

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
04	--	02	03	80	20	50#	--	25@	175

Rationale:

Electrical Circuits and Network subject is categorized under engineering science group. Mainly this subject includes the concept and principles of circuits and circuit analysis. Diploma holders have to play the role as supervisor in Electrical Technology areas and also to assist in carrying out the analysis and investigation work.

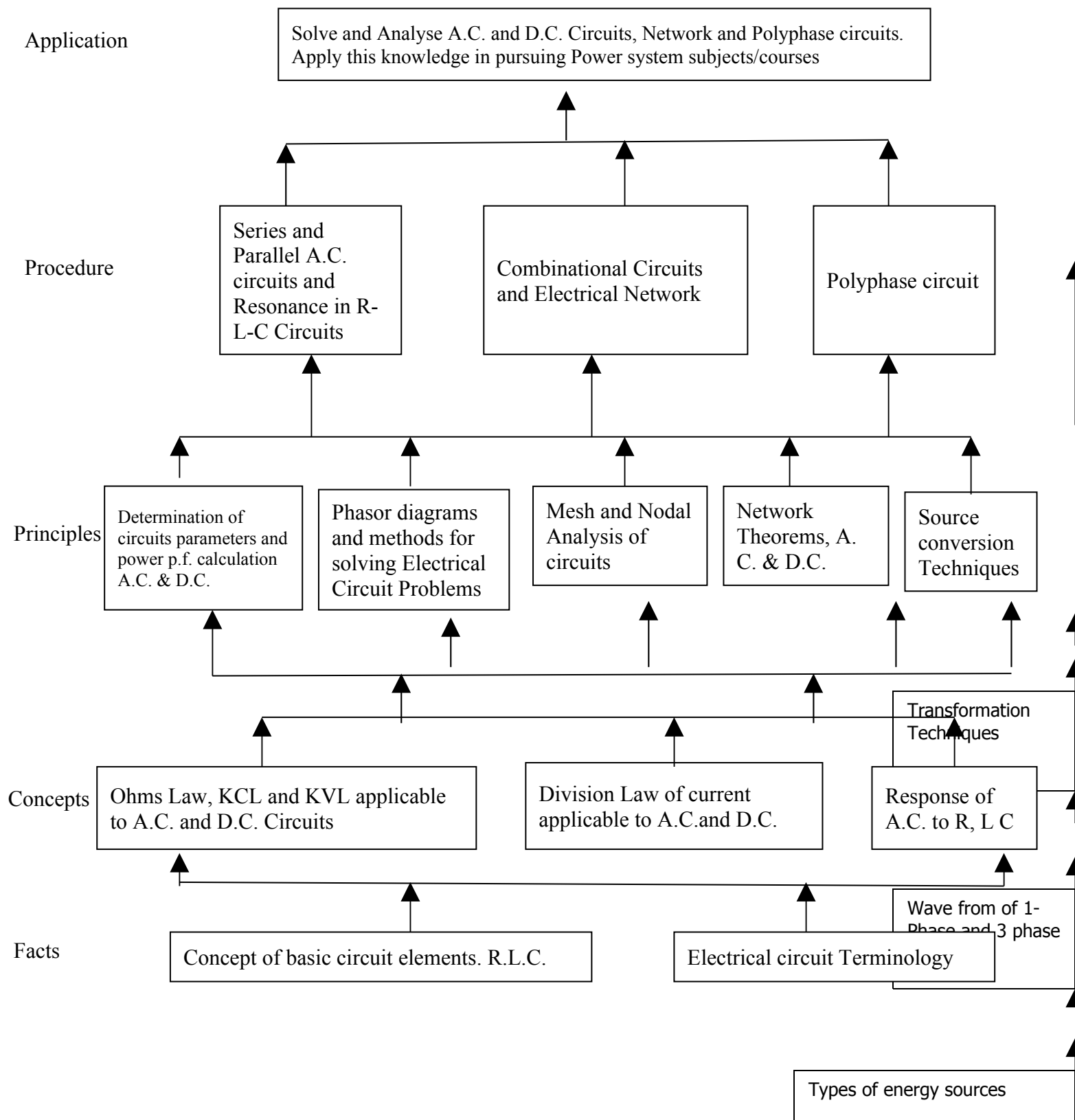
This subject finds utility in understanding the concepts in other electrical subjects such as Electrical Power System, Electrical Measurement and Instrumentation, & Electrical Machines etc.

Objectives:

The students will be able to:

1. Know and define the basic elements; electric circuit terminology; energy sources used in electric circuit and also AC waveform and its various quantities.
2. Interpret the response of R,L,C elements to AC supply
3. Calculate various parameters of AC Circuits.
4. Interpret performance of AC Series and Parallel Circuits.
5. Know relationship between phase & line values of various quantities in three phase circuits.
6. Use network theorems for solutions of DC Networks.

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks				
01	Review of Basic concepts of electrical Circuit 1.1 Electric Circuit Elements R,L,C 1.2 Energy Sources 1.3 A.C. waveform and definition of various terms associated with it 1.4 Response of pure R, L, and C to AC supplies. Vector Representation of alternating quantity.	08	06				
	Single phase AC Circuits 2.1 Series AC circuits R-L, R-C and R-L-C circuits. Impedance, reactance, phasor diagram, impedance triangle, power factor, Average power, Apparent power, Reactive power, Power triangle (Numerical) 2.2 Series Resonance, quality factor (Numerical) 2.3 Parallel AC circuits R-L, R-C and R-L-C circuits. Admittance, Susceptance, Solution by admittance method, phasor diagram and complex Algebra method. (Numerical) 2.4 Parallel resonance, quality factor. 2.5 Comparison of series and Parallel circuits.			18	24		
	Poly phase AC Circuits 3.1 Generation of three phase e. m. f. 3.2 Phase sequence, polarity marking 3.3 Types of three-phase connections. 3.4 Concept of unbalanced load and balanced load. 3.5 Line, phase quantities and power in three phase system with balanced star and Delta connected load & their interrelationship 3.6 Advantages of polyphase circuits over single phase circuits					14	18
	Principles of circuit Analysis (AC and DC circuits) 1.1 Mesh analysis.(Numerical) 1.2 Node analysis with voltage current source .(Numericals) Star/delta & Delta/star transformations.(Simple Numericals)						
Network Theorems (Statement, procedure, applications and areas of applications, Simple Numerical) 5.1 Superposition Theorem 5.2 Thevenin's Theorem 5.3 Norton's Theorem 5.4 Source conversion /ideal voltage and current source 5.5 Maximum power transfer Theorem	16	20					
Total			64	80			

Practical:

Skills to be developed:

Intellectual Skills:

1. Interpret results
2. Calculate values of various components for given circuits
3. Select instruments

Motor Skills:

1. Connect the instruments properly.
2. Take accurate readings.
3. Draw phasor diagrams and graphs.

List of Practical:

- 1) To observe A.C. waveform on C.R.O. and calculate average & R.M.S. Values, frequency, Time Periods.
- 2) To determine impedance & Plot the phasor diagram of R-L series circuit.
- 3) To determine the current and P.F. of R.C. series circuit.
- 4) To determine the current and P.F. of R.L.C. series circuit.
- 5) To determine the current and P.F. in R.L. Parallel circuit.
- 6) To determine the current and P.F. in R.C. Parallel circuit.
- 7) To determine the current and P.F. in R.L.C. Parallel circuit.
- 8) To verify the line and phase values of voltage & current in star connected balanced load & Compare with practical situation.
- 9) To verify the line and phase values of voltage & Current in delta connected balanced load & Compare with practical situation.
- 10) To verify the superposition theorem applicable to D.C. & A.C. circuit.
- 11) To verify Thevenin's theorem applicable to D.C. & A.C. circuit
- 12) To verify Norton's theorem applicable to D.C. & A.C. circuit
- 13) To verify the maximum power transfer Theorem applicable to D.C. & A.C. circuit.
- 14) To verify conditions for Series and Parallel Resonance

LIST OF PRACTICE ORIENTED PROJECTS:

- 1) To observe Response of R; L; and C to A.C. supply. Observe the current and voltage wave forms on C. R. O. and determine magnitude and phase angle of voltage and current.
- 2) To obtain Resonance in R-L-C series circuit and study the quality factor and bandwidth. Give applications of series resonance circuit and Draw the curve showing variation of R, X_L, X_C, I with F .
- 3) To verify KCL, KVL, Superposition theorem, Thevenin's theorem and maximum power transfer theorem applicable to A.C. circuits.

Learning Resources:**Books:**

Sr. No.	Author	Title	Publisher
1.	Boylested R.L.	Introductory circuit Analysis.	Wheeler, New Delhi
2.	Edminister	Schaum online series Theory and problems of Electric circuits	T. M. G. H. , Newyork
3.	A. Sudhakar	Circuit and network	Tata McGraw Hill
4.	V.N. Mittle	Basic Electrical Engineering.	Tata McGraw Hill
5.	B. L. Theraja	Electrical Technology Volume-I	S. Chand & Co.