DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

II YEAR

M SCHEME

III SEMESTER

2015 – 2016 onwards

ELECTRICAL CIRCUIT THEORY

CURRICULUM DEVELOPMENT CENTRE

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

M - SCHEME

Course Name : Diploma in Electrical and Electronics Engineering

Subject Code : 33031

Semester : III Semester

Subject Title : **ELECTRICAL CIRCUIT THEORY**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per Semester: 15 Weeks

Subject	Instruction		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ELECTRICAL CIRCUIT THEORY	6	90	25	75	100	3 hrs

TOPICS AND ALLOCATION OF HOURS:

UNIT	TOPIC	TIME (hours)
I	(a) Electrostatics (b) D C Circuits	14
II	Circuit Theorems	12
III	Single Phase Circuits	13
IV	Resonant Circuits	12
V	Three phase Circuits	12
	Revision and Test	12
	Total	**75**

Rationale:

- Electric circuit analysis is the process of finding the voltages across, and the currents through, every component in the network. There are many different techniques for calculating these values.
- This subject is course on the basics of Network Analysis, introduction to network elements and explained all the possible method for finding voltage and current across any network Component with DC, single phase AC and 3 phase ac sources.
- It aims at making the student conversant with different techniques of solving the problems in the field of Electric circuits and analysis.

Objectives:

The students should be able to:

1) Explain the concept of electrostatics and capacitance effect and analyze different Circuit Elements, Energy Sources and analysis of Network by Kirchhoff's Laws.

2) Analyze the concept of Node and Mesh Analysis; analyze different theorems for dc circuits.

3) Analyze single phase circuits using resistor, inductor & capacitor elements.

4) Explain and analyze series and parallel resonant behavior of a circuit.

5) Analysis of balanced three phase ac circuit and three phase power measurement

DETAILED SYLLABUS

CONTENTS

UNIT	NAME OF THE TOPICS	HOURS
I	**(a) ELECTROSTATICS** Electric Flux-Electric Flux Density-electric Field Intensity-electric potential-Coulomb's laws of electrostatics-concept of capacitance - Relationship between Voltage, Charge and capacitance – energy stored in a capacitor – capacitors in series and in parallel – Problems in above topics. **(b) D C CIRCUITS** Basic concepts of current, emf, potential difference, resistivity, temperature coefficient of resistance – Ohm's Law – application of Ohm's law – work, power energy – relationship between electrical, mechanical and thermal units – resistance – series circuits – parallel and Series parallel circuits – Kirchhoff's laws –Problems in the above topics.	14
II	**CIRCUIT THEOREMS** Mesh equations – Nodal equations – star/delta transformations – Superposition theorem – Thevenin's theorem – Norton's theorem – Maximum power transfer theorem. (Problems in DC circuits only)	12
III	**SINGLE PHASE CIRCUITS** 'j' notations – rectangular and polar coordinates – Sinusoidal voltage and current – instantaneous, peak, average and effective values – form factor and peak factor(derivation for sine wave) – pure resistive, inductive and capacitive circuits – RL,RC, RLC series circuits – impedance – phase angle – phasor diagram – power and power factor – power triangle – apparent power, active and reactive power – parallel circuits(two branches only) - Conductance, susceptance and admittance – problems on	13

	all above topics.	
IV	**RESONANT CIRCUITS** Series resonance – parallel resonance (R,L &C; RL&C only) – quality factor – dynamic resistance – comparison of series and parallel resonance – Problems in the above topics - Applications of resonant circuits	12
V	**THREE PHASE CIRCUITS** Three phase systems-phase sequence –necessity of three phase system–concept of balanced and unbalanced load - balanced star &delta connected loads – relation between line and phase voltages and currents – phasor diagram – three phase power and power factor measurement by single wattmeter and two wattmeter methods – Problems in all above topics.	12

TEXT BOOK

S.No	Name of the Book	Author	Publisher
1	Electric Circuit Theory	Dr.M.Arumugam Dr.N.Premkumaran	Khanna Publishers, New Delhi

REFERENCE BOOKS

S.No.	Name of the Book	Author	Publisher
1.	Circuits and Networks Analysis and Synthesis.	A. Sudhakar Shyammohan S Palli	Tata McGraw Hill Education Private Ltd.,
2	Electric Circuits	Mahamood Nahvi Joseph A Edminister	Tata McGraw Hill Education Private Ltd.,