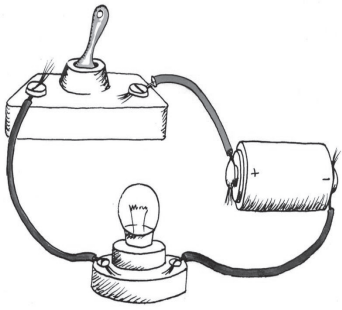
19BM204 ELECTRIC CIRCUIT THEORY



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Hours Per Week :

L	T	P	C
3	-	-	3

Total Hours :

L	T	P
45	15	-

WA/RA	SSH/HSH	CS	SA	S	BS
-	-	-	-	-	-

PREREQUISITE COURSE: Engineering Mathematics, Basic Electrical and Electronics Engineering.

COURSE DESCRIPTION AND OBJECTIVES:

This course enables the students to learn advanced concepts in circuit analysis which are applicable in solving electronic circuits. The aim of this course to introduce the student to the derivation of transient responses of RC, RL and RLC circuits, steady state response of circuits to sinusoidal excitation in time domain, application of phasors to circuit analysis and introduction to graph theory to analyse circuits.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes.

COs	Course Outcomes	POs
1	Apply basic circuital laws and network theorems to liner circuits and two port networks.	1
2	Formulate tie-set and cut-set matrices for network topology.	2
3	Realize and analyze the network behavior.	2
4	Attain fault finding techniques that will be useful in circuit working.	1, 4

SKILLS:

- ✓ *Determine currents and voltages of all elements of any electrical system network.*
- ✓ *Analysis of simple circuits by using theorems.*
- ✓ *Calculate power, current and voltage in DC circuits.*

UNIT - I **L-9**

BASIC CONCEPTS: Basics of electrical circuits, Basic circuit element, Types of elements, Types of sources, Elementary connections, Series and parallel combination of various elements, Energy calculation in the energy elements, Power calculations, Stat delta conversion and vice versa, Voltage division principle in series circuit, Current division principle in parallel circuit, Ohms's law, Basic circuit laws (KVL, KCL), Nodal analysis, Mesh analysis (Analysis for only independent sources).

UNIT - II **L-9**

NETWORK THEOREMS: Super position, Thevinin's and Norton's theorem (DC networks only), Maximum power transfer theorem (AC and DC networks), Reciprocity, Millman's theorem, Numericals on all topics.

UNIT - III **L-9**

TRANSIENT BEHAVIOUR AND INITIAL CONDITIONS: Source free and forced response circuits in series and parallel combination of RL, RC and RLC circuits for DC excitations.

UNIT - IV **L-9**

RESONANT CIRCUITS: Series and Parallel resonance - variation of current and voltage with frequency, selectivity and bandwidth; Q-factor parallel resonance, General case resistance present in both branches, Selectivity and bandwidth, Numerical on all topics.

UNIT - V **L-9**

LINEAR TWO PORT NETWORKS AND NETWORK TOPOLOGY: Liner two port networks, Inter connection of two port networks, Graph of a network, Concepts of tree and co-tree, Incidence matrix, Tie-set and cut-set schedules, Solution of resistive networks using equilibrium equations in matrix form, Principle of duality.

TEXT BOOKS:

1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis", 8th edition,Tata McGraw-Hill, 2007.
2. A. Sudhakar and Shyammohan S Palli, "Circuits & Networks: Analysis and Synthesis", 5th edition, Tata McGraw-Hill, 2007.
3. D. Roy Choudhury, "Networks and Systems", 3rd edition. New Age International Publishers.
4. M.E. Van Valkenburg, "Network Analysis", Prentice-Hall, 3rd edition.

REFERENCE BOOKS:

1. Richard C. Dorf and James A. Svoboda, "Introduction to Electric Circuits", Wiley, 9th edition.
2. Mahmood Nahvi, "Electric Circuits", 9th edition, McGraw Hill.