C.U.SHAH UNIVERSITY

FACULTY OF: - Technology & Engineering
DEPARTMENT OF: -Electrical Engineering
BRANCH: Electrical & Electronics Engineering
SEMESTER: - III
COURSE:- B.Tech
CODE: - 4TE03CIT1
NAME – Circuit Theory

Teaching & Evaluation Scheme

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
							Theory				Practical (Marks)			
							Sessional Exam		University Exam		Internal		University	Total
		Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE03CIT1	Circuit Theory	4	0	2	6	5	30	1.5	70	3	30	20	---	**150**

Objectives

- To study various techniques to solve various D.C and A.C. Networks
- To study the transient and steady state response of various A.C Networks.

Prerequisites

- Basics of A.C and D.C. Networks
- Laplace and Fourier Transforms

Course Outlines

Sr. No.	Course Contents	Hours
1	**Network terminology and simplification Techniques** Network, Network Element, Branch, Junction Point, Node Measurement, Sources, Voltage sources, Current Sources, Dependent Source. Introduction to Network simplification techniques, KVL, KCL, Mesh Analysis, Nodal Analysis, Dot conventions, Coefficient of Coupling, Combination of sources.	04
2	**Network Theorems** Introduction, Superposition Theorem, Thevenin's Theorem, Norton Theorem, Maximum Power Transfer Theorem, Millaman's Theorems, Reciprocity Theorem, Tellegan's Theorem. Introduction to Graph Theorem , Loop Analysis, Node Analysis, Cut Set Matrix, Tie Set Matrix, KVL and KCL equilibrium equations.	10
3	**Network Analysis Using Laplace Transform** Introduction, Definition of Laplace, Transform Properties of Laplace Transforms, Standard Time Functions, Relationship between Standard Time Functions, Laplace Transforms of Standard Functions, Laplace Transform of a Periodic Functions	10

	Convolutions Theorem, Inverse Laplace Transform, Application of Laplace in solving differential equations.	
4	**Transient Response and Initial Conditions** Introduction, background of Differential Equations, Homogenous and Non-homogenous equations, Initial Conditions in Network Initial Conditions in Elements, Step Response of R-L-C Elements.	10
5	**Network Functions and Pole – Zero Plot &Transfer Function Synthesis** Introduction, System Functions Impulse Response System Function. Pole and Zeros. Pole – Zero Plot, Significance of Poles and Zeros linear print Functions. Introduction, Transfer Functions of Two – Port Terminated Network, Properties of Transfer Functions, Zeroes of Transmission, Network with constant Resistance Bridge and Lattice Networks, Lattice Network with both ends terminated in R constant Resistance Bridge T network.	09
6	**Two-Port Network** Introduction, One and Two Port Network Parameters Z-Parameters, Y- Parameters, h- Parameters, ABCD Parameters. Condition of Symmetry & Reciprocity, Interrelationships between the Parameters, Interconnection of Two port Series and parallel Permissibility of connection, Equivalent T and pie Networks.	09

Learning Outcomes

- The students would be able to solve the various A.C and D.C Networks by using various analysis techniques. This will help students in designing advanced networks used in various circuits.

Books Recommended

1. Network Analysis by M. E. Van Valkenburg ,PHI Publication
2. Network Analysis by G. K. Mittal, Khanna Publication
3. Engineering Circuit Analysis by W. H. Hyat, J. E. Kommetry , TMG Publication
4. Circuit Theory by A. Chakrabati , Dhanpat Rai Publication
5. Electric Circuits by J. Eduminister, PHI Publication
6. Linear Circuit Analysis By-S. Madhu PHI Publication