

# Electrical Networks

S.E. Sem. III [EXTC]

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## EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	3 Hrs.	50
Oral Exam	–	25
Term Work	–	25

## SYLLABUS

**Objective** To understand Basic principles and components of Electrical, Electronic circuit elements.

**Pre- requisite** Fundamentals of DC and R-L-C AC networks requisite

**1. Network Analysis :-**

DC Network Analysis with independent and dependent sources, AC Network analysis. Coupled coils-mutual inductance.

**2. Graph Theory :**

Fundamental definitions, The Incidence matrix, The loop matrix and cut-set matrix, Loop, Node and Node-pair definitions.

**3. Time response of first and second order systems :**

Initial conditions, Evaluation and Analysis of Transient and steady state responses using classical technique and Laplace Transform.

**4. Network Functions :**

Network functions for the one port and two port networks, Driving point and transfer functions, Poles and Zeros of Network functions and constraints on their locations, Time domain behaviour as related to the Pole- Zero plot. Draw Bode plot for all types of network functions.

**5. Two-port parameters :**

Open circuit, short circuit, transmission and hybrid parameters, relationship between parameter sets, reciprocity and symmetry conditions, inter-connection of two-port networks, T and Pi representation, Terminated two-port networks.

**6. Elements of realisability theory :**

Causality and Stability, Hurwitz polynomials, Positive real functions.

**Fundamentals of Network Synthesis (for driving point functions only) :**

Elementary Synthesis Procedures, Properties and synthesis of L-C, RC and R-L impedance and admittance functions, synthesis of R-L-C functions.

**Reference :**

1. Network Analysis (*M. E. Valkenburg*) – PHI publication.
2. Network Analysis and systems (*Frenklin F. Kuo*) – John Wiley & sons publications.
3. Electrical Network Theory (*Balabanacan and Bickart*) – Robert E Kreigewr publishing company

