JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. EEE-II Sem

L	T/P/D	C
4	-/-/-	4

(A40213) NETWORK THEORY

Objective:

This course introduces the basic concepts of network theory which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course if laid on the basic analysis of circuits which includes three phase circuits, transient analysis of DC and AC circuits , network functions, two-port network parameters, Fourier analysis of AC circuits, design and analysis of filters.

UNIT-I:

Three-Phase AC Circuits: Phase sequence- Star and delta connection-Relation between line and phase voltages and currents in balanced systems-Analysis of balanced and unbalanced 3 phase circuits-Measurement of active and reactive power.

UNIT-II:

D.C & A.C Transient Analysis: Transient response of R-L, R-C, R-L-C circuits (Series and parallel combination) for D.C and A.C excitation-Initial conditions-solution method using differential equation and Laplace transforms.

UNIT-III:

Network Functions: The concept of Complex Frequency, Physical Interpretation of Complex Frequency, Transform Impedance and Transform Circuits, Series and parallel Combination of Elements, Terminal Pairs or Ports, Networks Functions for the One-port and Two-port, Poles and Zeros of Network Functions, Significance of poles and Zeros, Properties of Driving Point Functions, Properties of Transfer Functions, Necessary Conditions for Driving Point Functions, Necessary Conditions for Transfer Functions, Time Domain Response from Pole Zero Plot.

UNIT-IV:

Network Parameters: Two port network parameters – Z, Y, ABCD and hybrid parameters and their relations. Cascaded networks, concept of transformed network – two-port network parameters using transformed variables.

UNIT-V:

Filters and Fourier analysis of A.C Circuits: Low pass, High pass, Band pass, Band elimination, Prototype filter design. The Fourier theorem, consideration of symmetry, exponential form of Fourier series, line spectra and phase angle spectra, Fourier integrals and Fourier transforms, properties of Fourier transforms.

TEXT BOOKS:

1. Electric Circuits, A.Chakrabarhty, Dhanipat Rai & Sons.
2. Network analysis, N.C Jagan and C. Lakhminarayana, BS publications.

REFERENCE BOOKS:

1. Engineering circuit analysis, William Hayt, Jack E. Kemmerly, S M Durbin, McGraw Hill Companies.
2. Electrical Circuits, David A.Bell, Oxford University Press.
3. Electric Circuit Analysis, K.S.Suresh Kumar, Pearson Education.
4. Circuits, A.Bruce Carlson, Cengage Learning.
5. Network Analysis and Circuits, M.Arshad, Infinity Science Press.
6. Electrical Circuits an Introduction, KCA Smith & RE Alley, Cambridge University Press.

Outcome:

After going through this course the student gets a thorough knowledge on three-phase systems of electrical circuits, transient analysis of AC and DC networks, Laplace transforms, different types of network functions, two-port network parameters, operation and design of various filter circuits, Fourier transforms and analysis of AC circuits through Fourier transforms , with which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.