# AMEC19 NETWORK ANALYSIS AND SYNTHESIS

## UNIT-1 INTRODUCTION TO GRAPH THEORY
1.1 Definitions- graph, tree, spanning tree, loop,
1.2 Co-tree, cut set, tie set, loop and nodal analysis,
1.3 Introduction to continuous time signal,
1.4 Unit step, ramp, and impulse.

## UNIT-2 NETWORK TRANSIENT AND STEADY STATE ANALYSIS
2.1 Transient response of simple RL,RC, series and parallel circuits,
2.2 Transient response of RLC series and parallel circuits for sinusoidal and step input excitation using Laplace transform method.
2.3 Differential equation formation of linear time invariant continuous systems, block diagram representation of LTI continuous networks and systems, time domain analysis of LTI network using laplace transform.
2.4 Relation between impulse response and system functions, concepts of transform impedance and synthesis.

## UNIT-3 NETWORK FUNCTIONS
3.1 Concept of Complex Frequency, Transform Impedances,
3.2 Network function of one port and two port networks, Concept of poles and zeros,
3.3 Relation between locations of poles. Time response and stability.
3.4 Frequency response and bode plots.
3.5 Interrelation between frequency response and convolution integral.

## UNIT-4 TWO PORT NETWORKS
4.1 Two port parameters, Inter-conversion of 2 port parameter, network function-
4.2 Driving point and transfer function, Inter-connections of 2 port networks,
4.3 Reciprocity ladder networks, Image impedance,
4.4 Characteristic impedance, T-Pi transformation and analysis.

## UNIT-5 POSITIVE REAL FUNCTIONS AND PROPERTIES
5.1 Synthesis of LC,
5.2 RL and RC using Cauer and Fosters first and second form.

### Reference Books:
1. Narsingh Deo: Graph theory
2. A.Chakrabarti,"Circuit Theory" Dhanpat Rai & Co.
3. W.H. Hayt & Jack E-Kemmerly, Engineering Circuit analysis" Tata McGrawHill.
4. Soni, Gupta,"Circuit Analysis", Dhanpat Rai & Sons.