MANGALORE **UNIVERSITY**

DEPARTMENT OF ELECTRONICS
MSc Electronics

ELS 455 - NETWORK ANALYSIS

Unit I   **10 Hours**

Introduction; Relationship of Circuit Analysis to Engineering, Analysis and Design, Computer-Aided Analysis, Successful Problem-Solving Strategies.basic components and electric circuits; Units and Scales, Charge, Current, Voltage, and Power. Voltage and Current Sources, Ohm"s Law.
voltage and current laws, Nodes, Paths, Loops, and Branches, Kirchhoff"s Current Law and Voltage Law. The Single-Loop Circuit, The Single-Node-Pair Circuit, Series and Parallel Connected Sources, Resistors in Series and Parallel, Voltage and Current Division. basic nodal and mesh analysis; Nodal Analysis, The Supernode, Mesh Analysis, The Super mesh, Nodal vs. Mesh Analysis: A Comparison, Computer-Aided Circuit Analysis.

Unit II   **10 Hours**

Handy circuit analysis techniques; Linearity and Superposition, Source Transformations, Thévenin and Norton Equivalent Circuits, Maximum Power Transfer, Delta-Wye Conversion, Selecting an Approach: A Summary of variousTechniques.
the operational amplifier; The Ideal Op Amp: A Cordial Introduction, Cascaded Stages, Circuits for Voltage and Current Sources, Practical Considerations, Comparators and the Instrumentation Amplifier.
capacitors and inductors; The Capacitor, The Inductor, Inductance and Capacitance Combinations, Consequences of Linearity, Simple Op Amp Circuits with Capacitors, Duality, Modeling Capacitors and InductorswithPSpice.

Unit III   **10 Hours**

Basic RL and RC circuits; The Source-Free RL Circuit, Properties of the Exponential Response, The Source-Free RC Circuit, A More General Perspective, The Unit-Step Function, Driven RL Circuits, Natural and Forced Response, Driven RC Circuits, Predicting the Response of Sequentially Switched Circuits. The RLC circuit; The Source-Free Parallel Circuit, The Overdamped Parallel RLC Circuit, Critical Damping, The Underdamped Parallel RLC Circuit, The Source-Free Series RLC Circuit, The Complete Response of the RLC Circuit, The Lossless LC Circuit.
two-port networks; One-Port Networks, Admittance Parameters, Some Equivalent Networks, Impedance Parameters, Hybrid Parameters, Transmission Parameters.

Text Books:

1. "Engineering Circuits Analysis," William H. Hayt, Jack E. Kemmerly, Steven M. Durbin, 8th Edition, McGraw-Hill Publication, 2012.

Reference Books:

1. "Introduction to Modern Network Synthesis,"VanValkenbergM.E.,John Wiley and Sons, Inc, 1960.
2. "Network Analysis and Synthesis," Franklin. F. Kuo, II Ed, John Wiley & sons, 1999.
3. "Network Analysis & Synthesis," UmeshSinha, SatyaPrakash Pu