EE-124 Basic Electricity and Electronics

Fundamentals of Electric Circuits: 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, Kirchhoff's Voltage Laws, the single loop.

Circuits: the single node-pair circuits, series and parallel connected. Independent sources, resistors in series and parallel, voltage and current division.

Basic Nodal and Mesh Analysis: Multi-Nodal Analysis, the super node, Mesh Analysis, the super mesh.

Circuit Analysis Techniques: linearity and Superposition, Source Transformations, The venin and Norton Equivalent Circuits, Maximum Power Transfer, Delta-Wye Conversion

Capacitors and Inductors: Capacitors, Inductor, Inductance and Capacitance Combination

Basic RL and RC Circuits: The Source-Free RL Circuit, Properties of the Exponential Response, the Source-Free RC Circuits. the Unit-Steps Function and driven RL Circuits. Natural and forced response and driven RL Circuits.

The RLC Circuit: The Source-Free Parallel Circuit, the over damped parallel RLC Circuits, Critical Damping, the under damped Parallel RLC Circuit. the Source-Free Series RLC Circuit, the complete response of the RLC Circuit. The lossless LC Circuit

Recommended book(s)

Text Books:

1. Charles Alexander, *Fundamentals of Electric Circuits, 6th edition,* McGraw-Hill Education, 2016

Reference Books:

M. A. Laughton D.F. Warne, Electrical Engineer's Reference Book, 16th Edition, Elsevier, 2002