

EXAM REVIEW TOPICS:

Lecture 2:

- * What is current?
 - * Sign convention
 - * Positive and negative charge
 - * AC versus DC

- * What is voltage?
 - * How is it related to energy?
 - * What is the “ground” potential?
 - * What is the physical ground “plane” versus the reference node?

- * Power?
 - * Passive sign convention
 - * Energy

- * Components
 - * Sign convention of voltage/current
 - * Sign convention of power

- * Voltage Source
 - * Ideal voltage source
 - * Real battery
 - * Internal resistance/ source resistance

- * Ideal switch
 - * voltage/current /power

- * From Physics: KCL/KVL
- * Battery packs (homework)

Lecture 3:

- * Conductors
 - * Ideal conductors
 - * Real conductors
 - * Ohm’s law
 - * Calculating resistance
 - * Conductance
 - * Power loss in conductors
 - * Strain gauge as an example

- * Resistors as modeling elements
 - * Light bulb

- * Motor
 - * Antenna
 - * Speakers
 - * Anything passive!
- * Energy loss in power delivery
 - * High voltage versus high current
 - * Need for transformers / AC
- * Resistors
 - * Series resistors
 - * Parallel resistors

Lecture 4:

- * Current source
- * Dependent sources versus independent sources
- * Resistive dividers
 - * Voltage dividers
 - * Current dividers
 - * Shorts and opens/Winners and losers
- * Variable resistors/Pots
- * Efficiency of divider circuits

Lecture 5:

- * Nodal analysis
 - * counting nodes
 - * reference node
 - * eliminating nodes
 - * super nodes
 - * trivial nodes
 - * Nodal without dependent sources
 - * Nodal with dependent sources
 - * Knowns versus unknowns
 - * Setting up equations in standard format (LHS = RHS)
 - * LHS = unknowns
 - * RHS = knowns

Lecture 6:

- * Linearity and Superposition
- * Thevenin Equivalent
 - * Voc and Isc
 - * "Req" approach without internal sources

- * “Req” with independent sources
- * Norton Equivalent
- * Maximum power transfer theorem
- * Wheatstone Bridge (homework)

Lecture 7:

- * Amplifiers
 - * Terminals
 - * Signal pins versus power pins
 - * Gain
 - * Ideal vs. Real
 - * Input R / Output R
 - * Equivalent circuit
 - * Loading
 - * Dividers at input / output
 - * Effective gain
 - * Cascade
 - * Dynamic Range
 - * Clipping
- * Types: CC, VV, CV, VC
 - * Most common is voltage/voltage