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 form (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