EELE 354: Electric Power Applications

Test 1: Study Topics

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Topics to Study:

- Electrical Fundamentals
  - Structure of Matter
    - General structure of an atom
    - How atom structure relates to conductivity
  - Understand relationship between current and electric charge (including equation)
  - Understand definitions of current, voltage, and resistance
  - Ohm's Law
- Electrical Power and Energy
  - Understand the relationships between work, power, and energy
  - Know the equation(s) for electric power
  - Know definition of efficiency and be able to calculate it based on power or energy information
  - Mechanical Transmission of Power
    - Mechanical drives - relationship between rotational speed of two machines and the number of teeth in the gears or the diameter of the pulley wheels that connect them
- Test Equipment
  - Know what equipment measures what electrical quantity
    - Know circuit connection required - e.g. connect in series or in parallel
    - Be able to draw the equipment in a circuit diagram (voltmeter, ammeter, power analyzer)

- Basic Resistive Electrical Circuits
  - Know difference between series and parallel circuits
  - Know how to combine resistors in a circuit (parallel vs. series)
  - Know Kirchhoff's Voltage and Current Laws (KVL, KCL)
    * NOTE: These are not explicitly labelled in your book by name, though the information is there.
  - Know how to apply Ohm's Law, KVL and KCL to analyze series, parallel and combination circuits.
  - Know how to apply power equation(s) to circuit elements
- Magnets and Magnetism
  - Know that like poles repel and opposite poles attract.
  - Be able to draw magnetic lines of force for a magnet (both regular and electromagnets)
  - Know relationship between current in a conductor and the induced magnetic field
    * How does magnitude of current affect strength of magnetic field
    * Using RIGHT hand rule find shape/direction of magnetic field
  - Know relationship between current in a coil and induced magnetic field
    * How does magnitude of current affect strength of magnetic field
    * Using RIGHT hand rule find shape/direction of magnetic field
  - Magnetic Force on Moving Charge and Current Carrying Conductors
    * Be able to use right hand rule (two rules that perform the same service were shown in lecture) to find direction of force
  - Magnetic Circuits
    * **We will cover this a little more in Monday's lecture**
    * Know relationship between magnetomotive force (mmf), magnetic flux, and reluctance
    * Know relationship between reluctance and permeance
- Other stuff
  - Understand and be able to do all homework problems
  - Understand and be able to do all the example problems given in the lectures
  - Understand and be able to do practice problems 1-4 from lecture 6
  - Understand the work you did in the labs and the questions you had to answer in them