

### Partial Goals for EEL 3472

At the conclusion of EEL 3472 you should be able to

1. Write the four Maxwell's equations in point (differential) and integral form and describe what the equations mean in physical terms.
2. Describe the development of the four Maxwell's equations starting with three laboratory experiments.
3. Describe the general characteristics of propagating waves of any type (e.g., acoustic, electromagnetic, gravity).
4. Use electromagnetic principles to decide when classical circuit theory is applicable to an electrical system and when it is not. What does one do when it is not?
5. Derive Kirchoff's Current and Voltage Laws for classical circuit theory from Maxwell's equations.
6. Define the classical circuit concepts of "resistance", "inductance", and "capacitance" from electromagnetic principles.
7. Define, contrast, and otherwise discuss the concepts of "electric field intensity", "electric flux density", "electric potential", "magnetic field intensity", and "magnetic flux density".
8. Know at least five techniques to calculate the electric field given all the charges (including those in dielectrics) and/or the electric potential on all conductors in a system.
9. Know at least two techniques to calculate the magnetic field given all the currents (including those trapped in magnetic materials) in a system.
10. Understand the math tools needed for items 1-9 above: algebra, calculus, vector math, 3-D geometry, and complex number and phasor theory.