INEL 4075 Fundamentals of Electrical Engineering
Fall Semester 2019

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Text: **Electrical Engineering:Principles and Applications Fourth Edition Allan R. Hambley**

Exams:
There will be 3 partial exams and 1 final exam.
Exam dates: sep 13, oct 23, and nov 22.
MAKE UP EXAMS WILL BE GIVEN ONLY FOR MEDICAL EXCUSES.
If there is a medical reason for missing an exam, you must certify this in order to request a make up. This must be done no later than the first day back after the medical leave.

Homework:
Homework problems will be given in class. The homework is not to be handed in, but for you to practice.

Final Grade: 500 points total, divided as follows:
exam 1: 100 pts.
exam 2: 100 pts.
exam 3: 100 pts.
final : 200 pts

Topics to Cover:

1. Basic Concepts
   a. Voltage
   b. Current
   c. Power
   d. Voltage Source
   e. Current Source
2. Resistance
   a. Resistors
   b. Ohms Law
   c. Voltage, Current and Power in a Resistor
   d. Voltage signs and Current directions in Resistors
3. Simple Resistive Circuits
   a. Nodes, Branches and Loops
   b. Kirchohff's Current Law
   c. Kirchohff's Voltage Law
   d. Series Circuits and Voltage Division
   e. Parallel Circuits and Current Division
   f. Series-Parallel Circuits
4. Sources
   a. Source Conversions
   b. Maximum Power Transfer Theorem
5. Analysis
   a. Loop (or Mesh) Analysis Method
   b. Determinants and Cramer's Rule
   c. Node Voltage Analysis Method
6. Network Theorems
   a. The Superposition Theorem
   b. Thevenin's Theorem
   c. Norton's Theorem
7. Alternating Current Elements
   a. Capacitors and Capacitance
   b. Series and Parallel connections of Capacitors
   c. Inductors and Inductance
   d. Series and Parallel connections of Inductors
8. Alternating Current and Voltage
   a. Period and Frequency of Sinusoidal AC Waveform
   b. Phase Shift of an AC Waveform
   c. Voltage-Current relationships in Resistor AC Circuits
   d. Average and RMS values of AC waveforms
   e. Phasor Representations
   f. Complex Numbers
   g. Simple AC Inductive circuits
   h. Simple AC Capacitive circuits
   i. Impedance
   j. Genaral RLC Circuits
9. Steady State Analysis of Simple AC circuits
   a. Series RL
   b. Series RC
   c. Series RLC
   d. Parallel RLC
   e. General Series-Parallel RLC
10. Power and Resonance in AC circuits
    a. Real, Apparent and Reactive Power dissipated
    b. Power Factor
    c. Resonance in RLC circuits
11. Loop and Node Analysis of AC Circuits
    a. Loop Analysis
    b. Node Voltage Analysis
    c. Delta - Y and Y - Delta conversions
12. Network Theorems for AC circuits
    a. Superposition Theorem
    b. Thevenin and Norton Theorems
    c. Maximum Power Transfer
13. Three Phase Circuits
    a. Delta and Y Source Connections
    b. Delta and Y Load Connections for Balanced Loads
    c. One-line equivalent circuits
    d. Power calculation
14. Mutually Coupled Circuits
    a. Ideal Transformer
    b. Dot convention