INEL 3105 Electrical System Analysis I
Spring Semester 2020

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Text: **Electric Circuits Ninth Edition Nilsson and Riedel**

Exams:
There will be 3 partial exams and 1 final exam.
Exam dates: March 4, April 3, and may 6.
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.

Your grade may improve due to attendance and class participation. I will not lower your grade if you do not participate in class, but will consider attendance and participation if you only need a few points to reach the next letter grade.

Topics to Cover:
1. Circuit Variables
   a. Voltage and Current
   b. The Ideal Basic Circuit Element
   c. Power and Energy
2. Circuit Elements
   a. Voltage and Current sources
   b. Electrical Resistance (Ohms law)
   c. Construction of a Circuit Model
   d. Kirchhoff's Laws
3. Simple Resistive Circuits
   a. Resistors in Series
   b. Resistors in Parallel
   c. Voltage-Divider Circuit
   d. Current-Divider Circuit
   e. Delta to Wye Equivalent Circuits
4. Circuit Analysis techniques
   a. Node Voltage Method
   b. Node Voltage Method & Dependent Sources
   c. Node Voltage Method Special Cases
   d. Mesh Current Method
   e. Mesh Current Method & Dependent Sources
   f. Mesh Current Method Special Cases
   g. Source Transformations
   h. Thevenin and Norton Equivalent Circuits
   i. Maximum Power Transfer
   j. Superposition
5. The Operational Amplifier (Op-Amp)
   a. Op-amp Terminals
   b. Terminal Voltages and Currents
   c. Inverting Amplifier Circuit
   d. Summing Amplifier Circuit
   e. Noninverting Amplifier Circuit
   f. Difference Amplifier Circuit
   g. An equivalent circuit of the Op-amp
6. Inductance and Capacitance
   a. Inductors
   b. Capacitors
   c. Series-Parallel combinations
7. Sinusoidal Steady-State Analysis
   a. Sinusoidal Source
   b. Sinusoidal Response
   c. Phasors
   d. Converting elements to Phasor Form
   e. Kirchhoff's Laws (they are the same)
   f. Series, Parallel, and Delta to Wye Simplifications
   g. Source Transformations and Thevenin and Norton Equivalent Circuits
   h. Node Voltage Methods
   i. Mesh Current Method
   j. Phasor Diagrams
8. Sinusoidal Steady-State Power Calculations
   a. Real and Reactive Power
   b. RMS value and Power
   c. Complex Power
   d. Power Calculations
   e. Maximum Power Transfer
9. Mutual Inductance
   a. Ideal Transformer
10. Two Port Circuits
   a. The Terminal Equations
   b. Two-Port Parameters
   c. Analysis of Two Port Circuit