Instructor: Selim S. Awad
Office: 212 ELB
Phone: 5935523
E-mail: sawad@umich.edu
Web-site: www.engin.umd.umich.edu/~sawad
Online meeting room: https://univofmich.acrobat.com/sawad/

Office Hours: Monday and Wednesday: 11:30 AM-12:30 PM
Thursday: 1-2:30 PM
and by appointment.

Course Overview:
1- Basic electrical concepts: current, voltage, power, electric filed, energy, power
2- Circuit elements: resistance, capacitance, inductance, voltage source, current source
3- Direct current (DC) circuits:
   - Basic laws: Ohm's law, Kirchhoff's laws
   - Nodal analysis and mesh analysis
   - Superposition theorem
   - Thevenin’s and Norton's theorems
   - Source transformation
   - Maximum power transfer
   - Applications of laws and theorems to circuits.
4- Transient analysis of circuits: first order and second order circuits.
5- Sinusoidal steady-state (AC) analysis:
   - Phasors
   - Impedance and admittance
   - Solving AC circuits
   - Power calculations.
6- The ideal operational amplifier.
7- Selected topics.

Grading system: First Mid-term test 20%
Second Mid-term test 20%
Final examination 30%
Labs and projects 30%

Course objectives and outcomes

Course objectives:
1. Proficiency in the analysis of AC and DC circuits
2. Proficiency in the construction, testing and verification of circuits
3. Proficiency in the use of electronic equipment including power supplies, signal generators, oscilloscopes and other measuring instruments

Course outcomes:
1. Ability to analyze DC linear circuits using basic circuit theory and mesh/node analysis techniques.
2. Ability to evaluate sinusoidal steady-state AC analysis using the concepts of phasor representation, impedance and admittance.
3. Ability to derive Thevenin and Norton equivalent circuits
4. Ability to evaluate frequency response both analytically and experimentally.
5. Ability to analyze basic op-amp circuits using ideal op-amp models.
6. Ability to use SPICE to analyze electrical circuits.
7. Ability to use electronic instruments to measure and test DC, AC, and transient circuits.
8. Ability to design a simple circuit through a project related to circuits and write project report.

This class runs under the College of Engineering and Computer Science Academic Code of Conduct. Specifically, the provost and deans have endorsed the following statement whose inclusion is required in each syllabus within the College, including this one:

“The University of Michigan-Dearborn values academic honesty and integrity. Each student has a responsibility to understand, accept, and comply with the College of Engineering and Computer Science Academic Code of Conduct. Cheating, collusion, misconduct, fabrication, and plagiarism are considered serious offenses. Violations will not be tolerated and may result in penalties up to and including expulsion from the university.”

Prerequisite assessment test (taken during the first week)

Note: Tests and exams are open book and notes. Honor Code must be strictly observed
Homework: Solutions to the homework assignments will be available to students.