ECE 210 "Circuits" – 4 cr. hrs.

Catalog Data 2009-2011	**Prerequisites: MATH 116 or equivalent and preceded or accompanied by PHYS 151** Fundamental laws, electrical elements and sources, energy and power. DC analysis of linear circuits. Node and mesh analysis. Operational amplifiers and op-amp circuits, Thevenin and Norton theorems. Sinusoidal steady-state response and the phasor concept. Introductory concepts on complex frequency, average power in AC circuits. Transient responses. *Three lecture hours per week and one three-hour laboratory per week.*
Textbooks	1. J. David Irwin, "Basic Engineering Circuit Analysis," Prentice Hall, Latest Edition. 2. Dorf, "Intro. To Electric Circuits" Latest Edition.
Coordinators	Profs. C. Mi and M. Shridhar, Department of Electrical & Computer Engineering
Prerequisites by Topic	1. Introductory complex algebra, calculus. 2. Introductory physics.
Topics	1. Basic electrical concepts, current, voltage and power (3 hours) 2. Ohm's Law, Kirchhoff's laws for analysis of circuits (4 hours) 3. Node and mesh analysis, circuit theorems (6 hours) 4. Introduction to operational amplifier circuits (4 hours) 5. Inductance and capacitance; source free first order circuits (4 hours) 6. Forced/natural, transient/steady state response (3 hours) 7. Sinusoidal steady-state, phasor, impedance and admittance (8 hours) 8. Resonant circuits and Frequency response (4 hours) 9. RMS values, average power and, power transfer (3 hours) 10. Exams (3 hours)
Laboratory Projects	One and two-week experiments covering such topics as: Laboratory instrumentation, Operational amplifier circuits, Experimental verification of basic theory (Ohms law, Superposition, etc., Sinusoidal amplitude and phase, transients (RL, RC, RLC), Circuit analysis; correlation of analytical, computational, and experimental evaluations, Selected design topics.
Computer Usage	PSpice analysis of electric circuits and project reports.
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. (Outcomes: a*, e*) 2. Ability to evaluate sinusoidal steady-state AC analysis using the concepts of phasor representation, impedance and admittance. (Outcomes: a*, e*) 3. Ability to derive Thevenin and Norton equivalent models for simple circuits. (Outcome: e*) 4. Ability to evaluate frequency response both analytically and experimentally. (Outcomes: a*, e*) 5. Ability to analyze basic op-amp circuits, using ideal op-amp models. (Outcomes: a*, e*) 6. Ability to use PSpice to analyze electrical circuits. (Outcome: k*) 7. Ability to use electronic instruments to measure and test DC, AC, and transient circuits. (Outcomes: b*, k*) 8. Ability to design a simple circuit through a project related to circuits and write project report. (Outcomes: c*, k*)
Assessment Tools	1. Exams and frequent quizzes. (1-5) 2. Reports from laboratory and project assignments. (1-8) 3. Assessment reports from follow-on courses, especially ECE 311 and ECE 317 are used to enhance the content of ECE 210.

KEY: Outcomes with "*" must be assessed in your report.

Instructor: Prof. M. Shridhar (mals@umich.edu , Office: 114 ELB and1080AB)

Grading Policy

Test 1	**10%**	Oct 2
Test 2	**15%**	Nov 4
Test 3	**15%**	Dec 4
Final (Comprehensive)	**35%**	Dec 16
Lab	**10%**	
Project	**10%**	
Assignments	**5%**	

In order to obtain an A in the course, you must obtain an A in the tests and an A in the Lab & Project. *If you do very well in the final, one of your bad grades **may** be discounted. Also progress in the course as measured by performance is rewarded.*

CLASS LECTURES: PLEASE NOTE THAT I DO NOT FOLLOW THE BOOK.

I PRESENT AN INTEGRATED APPROACH TO ANALYZING DC AND AC CIRCUITS. I BELIEVE (BASED ON EXPERIENCE) THAT STUDENTS LEARN CIRCUIT CONCEPTS MORE EFFECTIVELY WITH THIS INTEGRTED APPROACH.

IF YOU MISS MY LECTURES TOO FREQUENTLY, YOU ARE VERY LIKELY TO FACE DIFFICULTIES IN GETTING A DECENT GRADE. MAINTAINING GOOD CLASS NOTES WILL HELP IMMENSELY. I will provide handouts as necessary.

REQUIREMENTS: YOU WILL MAINTAIN A BOUND BOOK FOR YOUR CLASS NOTES. YOU WILL ENTER THE DATE WHEN YOU BEGIN WRITING YOUR NOTES. YOU WILL HIGHLIGHT ON THE MARGIN, ALL PROBLEMS SOLVED IN CLASS. I WILL PERIODICALLY EXAMINE YOUR NOTES. I WILL TAKE ATTENDACE REGULARLY.

Disability Resource Services

The University will make reasonable accommodations for persons with documented disabilities. Students need to register with Disability Resource Services (DRS) every semester they are enrolled for classes. DRS is located in Counseling & Support Services, 2157 UC. To be assured of having services when they are needed, students should register no later than the end of the add/drop deadline of each term.

Statement of Academic Integrity

The University of Michigan - Dearborn values academic honesty and integrity. Each student has a responsibility to understand, accept, and comply with the university's standards of academic conduct as set forth by the Code of Academic Conduct, as well as policies established by the schools and colleges. 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.

I WANT YOU TO DO WELL. GOOD LUCK