University of Massachusetts
Department of Electrical and Computer Engineering
Amherst, Massachusetts 01003

E&C-Eng 210 Circuits and Electronics I (4 credits)

Lectures:	MWF, 9:05 – 9:55, Goessman 20
Discussions:	MWTh, 2:30 – 3:45, Marston 211 (except weeks with labs, please also see schedule for possible adjustment)
Laboratories:	TWThFM 2:30 – 5:30, Marston 221, (not every week – see schedule)
Schedule:	See website for detailed schedule.

Instructor: Prof. Jun Yao, S419 Life Science Lab, juny@umass.edu

Office Hours: 10:30-11:30 am MWF

Prof. Paul Siqueira, 113E Knowles, siqueira@ecs.umass.edu

Office Hours: 9:30-11:00 am Tuesday, Thursday

Teaching Assistants Minghao Dong, minghaod@umass.edu

Office Hours: Saturday, 7:00-9:00 PM

Hongyan Gao, hongyangao@umass.edu

Office Hours: Thursday, 7:00-9:00 PM

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Office Hour: Tuesday, 7:00-9:00 PM

Course Synopsis: Mathematical models for analog circuit elements such as resistors, capacitors, opamps and MOSFETs as switches. Basic circuit laws and network theorems applied to dc, transient, and steady-state response of first- and second-order circuits. Modeling circuit responses using differential equations Computer and laboratory projects.

Prerequisites: Passing grade in MATH 132 or 135, and PHYSICS 152.

Grading Scheme: Letter grade based on following weights

(1) Homework and Laboratory Assignments (25%)

(2) Midterm Exam (1) (25%)

(3) Midterm Exam (2) (25%)

(3) Final Exam (25%)

Note on Homework:

1. There will be ten homework assignments (6 Regular homework + 4 Pre-lab homework). All of these will be assigned on Wednesday after lecture.
2. All homework is **due by 11:59 pm on Sunday** and must be submitted using Gradescope. A one-day automatic grace-period is allowed for submissions up to 11:59 pm on Monday. No permission is necessary to benefit from this grace period and no penalty is given for submissions entered before Monday night at 11:59 pm. No late submissions will be allowed past 11:59 pm on Monday.
3. The Prelab homework assignments will count 3½ times more than a regular homework assignment. (*e.g.*, 80 points for a pre-lab homework *versus* 20 points for a regular homework). **They must be completed before the associated lab.**
4. **No late homework will be accepted**, which means (i) for regular homework, you don't get a score; (ii) for Pre-lab homework there will be a severe 40% deduction (literally means that you will fail—see explanation below).
5. **A minimal of 60% grade (*e.g.*, 48 points out of 80 total) is needed from each Pre-lab assignment, in order to pass the course**. We do have make-up submission, but (i) make-up submission needs to score 72 points or above (90%) to get pass; (ii) the make-up eventually only gets a passing grade, *i.e.*, 48 points.
6. There are four *in*-lab experiences (The pre-lab homework is preparation for the in-lab experience). **You can not pass the course without completing these labs.**

References:

Foundations of Analog and Digital Electronic Circuits. Agarwal and Lang, Elsevier, 2005 (Required)

PSpice for Linear Circuits (uses PSpice version 15.7) 2nd Edition by J.A. Svoboda; Wiley, 2002 (Required)

Openstax University Physics Vol 2 (https://openstax.org/details/books/university-physics-volume-2)

Practical Electronics For Inventors, Scherz & Monk, McGraw Hill 2016.

Software

Students will be using ORCAD PSPICE for circuit analysis. This can be downloaded free from https://www.orcad.com/resources/download-orcad-lite Versions 16.6 and 17.2 are for 32 and 64 bit machines respectively. Mac users will need a Windows emulator

Learning Objectives:

- Understand the methodology of modeling real-life systems by lumped circuit models;
- Be able to analyze DC resistive circuits using network theorems such as superposition, Thevenin's and Norton's Theorems;
- Be able to analyze RC, RL, and RLC circuits through the use of differential equations;
- Be able to analyze DC and switching circuits using simple models for nonlinear devices such as diodes and MOSFETs
- Be able to use simple laboratory equipment such as voltmeters, ammeters, sources, and oscilloscopes.
- Be able to use modern software tools, particularly PSpice, for the analysis and simulation of electric circuits.

Accommodation Statement

The University of Massachusetts Amherst is committed to providing an equal educational opportunity for all students. If you have a documented physical, psychological, or learning disability on file with Disability Services (DS), you may be eligible for reasonable academic accommodations to help you succeed in this course. If you have a documented disability that requires an accommodation, please notify me within the first two weeks of the semester so that we may make appropriate arrangements.

Academic Honesty Statement

Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent