

**Department of Electrical and Computer Engineering  
University of Massachusetts/Amherst**

**ECE 310: Circuits and Electronics II, Fall 2019**

**Course Synopsis**

Analysis of circuit response to sinusoidal excitation; phasor analysis, impedance, admittance, power, frequency response, transfer functions, Bode plots, filters. Linear analysis of nonlinear circuits; DC biasing of 3 terminal devices, small signal analysis, single device amplifiers, small signal gain and frequency response. Computer and laboratory projects. (4 credits)

**Prerequisites**

ECE 201 (Analytical Tools for ECE), ECE 202 (Computational Tools for ECE), ECE 210 (Circuits and Electronics I)

**Instructors**

Lectures: Robert W. Jackson, 215G Marcus Hall, [jackson@ecs.umass.edu](mailto:jackson@ecs.umass.edu)

Office Hours: Monday and Thursday 4:00-5:00pm

Discussions & Labs: Guangyu Xu, 215C Marcus Hall, [guangyux@umass.edu](mailto:guangyux@umass.edu)

Office Hours: Tuesday and Wednesday 5:30-6:30pm

**Teaching Assistants**

Meenakshi Upadhyaya [mupadhyaya@umass.edu](mailto:mupadhyaya@umass.edu) Office Hours: TBD

Tianda Fu [tiandafu@umass.edu](mailto:tiandafu@umass.edu) Office Hours: TBD

**Course Meeting Times**

Lectures: MWF, 9:05-9:55 AM, Marston 132

Discussions: Section AA: Marston 220, Monday 1:25-2:15 (See schedule)

Section AB: Marston 220, Monday 2:30-3:45 (See schedule)

Labs: Section LL: Marston 221, Tuesday 2:30-5:30 (See schedule, some evening sessions)

Section LM: Marston 221, Wednesday 2:30-5:30 (See schedule, some evening sessions)

**Grading Scheme**

Letter grade based on the following weights:

(1) Homework and Lab Assignments (25%), (2) Two Midterm Exams (21% each), (3) Final (33%)

Note on Homework: There will be eleven homework assignments. Four of the assignments will be Prelab homework assignments that will count 4 times more than a regular assignment. Prelab assignments must be completed before the associated lab. All homeworks must be submitted on Gradescope by 2:30 pm on the due dates. *No late regular homework will be accepted. Late Prelab homeworks must be perfect and will then receive only a minimum passing grade.*

Note on Lab: There are four lab experiences. *You can not pass the course without completing these labs.*

**Textbook**

*Foundations of Analog and Digital Electronic Circuits*, Agarwal and Lang, Morgan-Kaufman publishers

## **Software**

Students can use either ORCAD PSPICE or CIRCUITLAB for circuit analysis. PSPICE can be downloaded free from <https://www.orcad.com/resources/download-orcad-lite> . Mac users will need a Windows emulator to run PSPICE. The university has a site license for the online simulator CIRCUITLAB; this may be more convenient for MAC users.

## **Course Goals**

Students completing this course will be able to:

1. Employ the concepts of phasors, impedances, admittances to analyze circuit response to sinusoidal inputs.
2. Develop a familiarity with frequency response including: transfer functions, gain and phase plots, bode plots, filters.
3. Be able to analyze circuits with nonlinear devices in order to design linear single device amplifiers.
4. Be able to analyze the small signal frequency response of single device amplifiers.
5. Be able to analyze the frequency and time response of opamp feedback circuits using simple behavioral models.
6. Design, build and measure basic electronic circuits.

## **ECE ACADEMIC HONESTY POLICY**

An Honor Code Policy has been adopted for all ECE students at UMass Amherst, the result of a joint initiative between students in Eta Kappa Nu (the ECE student honor society) and the Faculty of the ECE Department. The purpose of this policy is to emphasize engineering ethics as an important part of your education and career, and to enhance the value of your ECE degree from UMass. Simply put, the policy requires that each ECE student demonstrate high ethical standards by attesting to personal honesty and integrity for each examination taken and laboratory report completed. The policy fits within the framework of the existing Academic Honesty Policy of the University, and is similar to that used by other universities. Cheating will not be tolerated. A student found cheating on an exam will receive an automatic grade of F on the exam, and likely will fail the course as well.