

Department of Electrical and Computer Engineering
University of Massachusetts Amherst

ECE 323: Electronics I

Fall 2017 Syllabus

Catalog Description:

- Lectures plus four three-hour labs and discussion sections as scheduled.
- Principles of the design of simple analog and digital electronic circuits employing nonlinear devices such as diodes, field effect transistors (FETs) and bipolar transistors
- The design projects make use of PSpICE and include diode characteristics, transistor biasing, small signal analysis and modeling, amplifier design, CMOS gate characteristics. The design, simulation, and build cycle is emphasized. 4 credits.

Prerequisites:

In order to take ECE 323, students must have received a grade of C or better in ECE 212. Students must be familiar with PSpICE because it is used extensively in laboratory analysis and is required for the reports.

Web Site: All course material (announcements, handouts, assignments and solutions, grade records) will be available through MOODLE: <http://moodle.umass.edu>

Lectures: Prof. Guangyu Xu, Marcus 215C, guangyux@umass.edu

Recitations: Prof. Robert Jackson, Marcus 215G, jackson@ecs.umass.edu

Prof. Jun Yao, Marcus 215G, juny@umass.edu

For Faculty office hours, please see Moodle website

Teaching Assistants: (i) Minghao Dong, minghaod@umass.edu
(ii) Xingjian Chen, xingjian@umass.edu

For TA office hours, please see Moodle website

Undergraduate Teaching Assistant: TBD

Lectures: MWF 9:05 - 9:55 am Goessman, RM 20

Laboratories: For all lab sections, see the Course Schedule to determine lab weeks.

Lab Section 1a/1b: Tu 2:30 - 5:30 pm Marston 221

Lab Section 2: W 2:30 - 5:30 pm Marston 221

Lab Section 3: Th 2:30 - 5:30 pm Marston 221

Discussion Sections: Discussion will be held per Course Schedule

Disc. Section 1: M 1:25 - 2:15 pm Elab 303

Disc. Section 2: M 2:30 - 3:20 pm Elab 303

Textbook (Required):

Sedra, A.S., and K.C. Smith, *Microelectronic Circuits*. Oxford University Press, 7th edition, 2015.

Grading policy:

Four design projects 25% of total grade (See comments below)

Exam I 20% of total grade

Exam II 20% of total grade

Final (Cumulative) 25% of total grade

Homework 10% of total grade

Comments:

(1) Each project will be graded primarily on the preparatory design/simulation ("prelab report"). **The prelab reports are due before 2:30pm on the Tuesday of lab weeks, regardless of lab section. See course schedule or Moodle for more details. The prelab report should be the work of a single student alone.** Students who turn in a design that duplicates the design submitted by another student will cause all the students involved to get zero credit.

(2) An example prelab report is available on the course Moodle site.

(3) The prelab report grade will not be recorded (a grade of zero) unless that student completes the laboratory portion of the project. All laboratory results will be certified as complete by the laboratory instructor or T.A.

(4) **In order to pass the course**, a student must have a passing grade on each of the four design projects.

(5) **In order to pass the course**, a student must have at least a passing score on the average of the midterms and the final exam.

Course Objectives and Program Outcomes

There are five main Course Objectives for students taking ECE 323:

1. Mathematically model nonlinear electronic devices.
2. Analyze circuits using nonlinear devices for digital and analog applications.
3. Understand some of the fundamental circuit elements used in digital and analog circuits.
4. Design basic electronic circuits to meet a set of specifications.
5. Appreciate the value of comparing hand calculations, simulations, and measurements.

For undergraduate majors taking this course, these five objectives are related in part to ten broad capabilities (Program Outcomes) that we expect for all our BS graduates in the EE and CSE programs. These are related as shown in the table below.

Program Outcomes	Course Objectives				
	1	2	3	4	5
1. Well grounded in the fundamental concepts of math, physics, chemistry, computer science, and engineering science	Y	Y	N	N	P
2. Able to identify, formulate and solve problems in ECE	Y	Y	Y	Y	Y
3. Able to design and conduct experiments, and to analyze and interpret measured data	N	Y	N	N	Y
4. Capable of designing analog and digital systems, components, and processes to meet desired needs	N	N	Y	Y	Y
5. Proficient in using modern engineering techniques and computing tools for effective engineering practice	Y	Y	N	Y	Y
6. Experienced in engineering teamwork, and in solving technically diverse and multidisciplinary problems	N	N	N	P	N
7. Able to communicate effectively orally and in writing, and through symbolic and graphical expression	N	N	N	Y	Y
8. Aware of professional and ethical responsibilities as engineers	N	N	N	N	N
9. Aware of the impact of ECE technology and decisions on society	N	N	N	N	N
10. Motivated about the importance of lifelong learning, scholarship and professional development	N	N	Y	N	N

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. On the last page of your ECE 323 midterm and final exams, you will be expected to write out and sign your name to the Honor Code Pledge: **"On my honor, I have not given nor received aid on this exam."** This statement reflects your personal commitment to honesty and ethical practice in the taking of an exam. If you have not written and signed this, you will be contacted by the instructor. 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.