

# ECE 110

## INTRODUCTION TO ELECTRONICS

FALL 2016

## COURSE SYLLABUS

**Official Description:** 1 (lab only) or 3 hours credit

Introduction to selected fundamental concepts and principles in electrical engineering. The course places an emphasis on measurement, modeling, and analysis of circuits and electronics while introducing numerous applications. The course integrates other sub-discipline topics of ECE including, but not limited to, electromagnetics, control, signal processing, microelectronics, communications, and scientific computing basics. The lecture material is driven through lab work where sensors and motors are incorporated into an autonomous moving vehicle which is designed and constructed to perform tasks jointly determined by the instructors and students. *Course Director:* Prof. C. D. Schmitz

**Course  
Website**

<http://courses.engr.illinois.edu/ece110>

Check posted announcements regularly!

### Lecture Schedule

Section	Days	Time		Instructor	Email
AL4	Mondays & Wednesdays	9:00-9:50 am	1013 ECEB	Prof. Viktor Gruev	vgruev@illinois.edu
AL1		10:00-10:50 am	1002 ECEB	Prof. Chris Schmitz	cdschmit@illinois.edu
AL2	Beginning August 22 <sup>th</sup>	1:00-1:50 pm	1002 ECEB	Prof. Oliver Chen	oxgchen@illinois.edu
AL3		2:00-2:50 pm	1015 ECEB	Prof. Soo Choi	hyungsoo@illinois.edu

### Laboratory Schedule

Inclusive Dates	Classroom	Lab Director	Email
<b>Start:</b> Aug. 22 (Mon) <b>End:</b> Dec. 5 (Mon)	Texas Instruments Electronics Design Lab, 1001 ECE Building	Prof. Patricia Franke	pfranke@illinois.edu

**Notes:** Always read the laboratory assignment before your laboratory session. All of the lab sessions (except the first lab) include a *pre-lab* that you must complete *before* you go to your lab. Additional materials are at the course home page. All meetings are mandatory. See the absence policy.

## Office Hours Schedule

Regular Dates	Classroom	Reading Day	Office Hours Contact
<b>Start:</b> second week <b>End:</b> Last Wed of term <b>Exception:</b> Break	Texas Instruments Electronics Design Lab Lecture, 1005 ECEB	December 8 (Thursday)	<a href="mailto:rsood2@illinois.edu">rsood2@illinois.edu</a>
<i>Notes: Questions or concerns? You may go to any office hours that fit in your schedule. This schedule is <b>tentative</b>. See the course website for up-to-date scheduling. Printed versions of online homework assignments are made available via the web. Show your attempt in written form to receive TA help!</i>			

The official office hour schedule will be posted at our course website.

Saturday Open Lab is available for students working on projects. Labs may be made up on a Saturday session only if prior permission has been explicitly given by the TA.

Tutoring can be arranged. Please contact the course director, Prof. C. Schmitz, [cdschmit@illinois.edu](mailto:cdschmit@illinois.edu).

## Required Course Materials

- **Lecture Handouts** printed by Stipes Publishing available at IUB, also available online.
- **Laboratory Manuals** printed by Stipes Publishing available at IUB, also available online.
- **Laboratory equipment.** ECE110 Electronics kit (~\$80) plus RedBoard (~\$20) available at the ECE Supply Center.
- **i>clicker remote** to record responses to quizzes.
- **ECE 110 Class Notes** (FREE!) available online at our website.

## Optional Course Materials

- **ECE110 Add-ons:** hand-held multimeter, diagonal cutters, wire stripper, soldering iron.
- **Other texts** are on reserve at Grainger Library: See Suggested Reading on the course home page.

## Examinations: SELF-ARRANGED @ COMPUTER-BASED TESTING FACILITY.

Exam 1	Exam 2	Exam 3	Final Exam	
September 15-18	October 13-16	November 10-13	Time: TBA	Location: TBA

## Examination Policy

Exams are self-arranged, 50-minute sessions, and taken at the Computer-Based Testing Facility (CBTF) over a period of several days. If you have an unavoidable medical or personal emergency, the course director can allow you to take the exam at a later period. To be eligible for a make-up exam, you must notify a lecture instructor (**not** a TA) immediately, and you must document your absence as best you can. Students with documented disabilities must notify their lecture instructors **at least one week in advance of any affected exam**.

- <http://edu.cs.illinois.edu/cbtf/> documents the CBTF for students.
- The facility is in room 57 Grainger Library (to the far East side of the basement)
- The scheduler app (<https://edu.cs.illinois.edu/testcenter/>) will be available for students to sign up for exams.

## Homework

Homework problems are on-line. When you submit an answer to a problem, it is graded immediately. You may attempt each partial problem multiple times (often four attempts are allowed). There is a location in each problem for posting a question to the staff and other students on Lon Capa. Some problem sets might be hosted in the PrairieLearn system. We are still learning this system and not all resources may be available there. Any questions asked online will be addressed by one of our staff unless it is deemed sufficiently answered by another student. There is no partial credit for homework completed after the deadline.

**HOMEWORK  
DEADLINE**

Homework will be due  
**Fridays at 3 pm**  
unless stated otherwise.

Students will **not** be reminded about due dates. A request for excuse (sickness) must include appropriate documentation from the emergency dean, but is rarely granted. You should work regularly and in an organized manner. It is recommended that you begin a homework set immediately following the lecture covering that material.

## Information and Assistance

- **Instructors and Tutors:** See office hours.
- **Supervised Study Sessions:** Teams will be formed to study with peers (see announcements).
- **Tutoring:** Watch for announcements from class or check with IEEE/HKN, Tau Beta Pi, Women in Engineering (WIE), Women in Electrical and Computer Engineering (WECE) as well as the Center for Academic Resources in Engineering (CARE) located in Grainger Library.
- **ECE Advising Office:** For any questions that arise or just for someone to talk to, come by the ECE Advising Office in the administration suite in the Southeast corner, 2<sup>nd</sup> floor of ECEB. Prof. Schmitz is also an Undergraduate Academic Advisors and can be found in room 2120 ECEB.

## Laboratory Attendance Policy

Attendance is **mandatory**. If you have an unavoidable medical or personal emergency, contact your lab TA (**not** your lecture instructor) as soon as possible to arrange a make-up lab. If no make-up is possible, different arrangements **might** be made, see Professor Franke. This semester, labs **will** meet on the week of Labor Day (September 6-9). Because Monday, September 5 is a holiday, Monday sections will meet for laboratory experiment on Monday, September 12. Monday sections will then be the last to complete each lab and will meet on Monday, December 5 for their final presentations. Labs will **not** meet on the week of the fall break (November 21-25).

## Lecture Attendance Policy

Unannounced lecture quizzes will be given throughout the semester. Each day will be graded as *absent* or *present*. You need only 80% attendance to receive full credit for lecture quizzes. **Because of the generous attendance policy, excuses are not given for acute illness, sleeping late, i>clicker glitches, etc.** Students will receive lecture quiz/attendance credit even if they attend a lecture section for which they are not registered. We discourage students from switching lecture sections *continually* because topics might not be synchronized perfectly between sections. Your attendance grade will be posted about three weeks into the semester. It is your responsibility to ensure that you are receiving proper credit.

We invite relevant questions and comments during lectures. Address your questions and comments to the entire class; avoid disruptive behavior such as repeatedly talking to neighbors, unless the instructor invites you to form discussion groups. Kindly turn off cell phones and noisy devices during lectures and

use laptops only for tasks related to ECE110 (note taking, viewing homework, etc). Texting or web browsing is *not* allowed in class. Do not bring messy or noisy food.

## Grading Policy

Course grades will be based on **both** lecture and lab performance with these weights:

- **Lecture material (70%):** Hour exams (10%, 10%, 10%), Final exam (25%), Homework (10%), Attendance (lecture quizzes) (5%). The final exam carries added significance as your lowest hour exam score will be replaced by your final exam score if the result would improve your grade.
- **Laboratory (30%):** Includes such factors as experiments, design challenge, and effort.

## Grade Cutoffs

<b>A+</b> > 97	<b>B+</b> 87-90	<b>C+</b> 77-80	<b>D+</b> 67-70	<b>F</b> < 60
<b>A</b> 93-97	<b>B</b> 83-87	<b>C</b> 73-77	<b>D</b> 63-67	
<b>A-</b> 90-93	<b>B-</b> 80-83	<b>C-</b> 70-73	<b>D-</b> 60-63	

These cutoffs *might* be lowered, but they will not be raised. Furthermore, they are strict. For example, a grade of 89.99 is a B+ and not an A-. Both the lecture **and** the lab must be taken seriously and minimum proficiency must be shown in both.

<b>Important Lecture/Lab Policy</b>	<b>A failing grade will be given to any student who does not score at least 50% in both the lecture and the lab separately.</b>
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After each hour exam, an **estimated course letter grade** for each student will be assigned, based on the hour exams, homework problems to date, and an assumed high lab grade. **This estimate predicts your final letter grade *optimistically* if you continue the same level of effort throughout the remainder of the semester.** If you receive a low letter grade after Hour Exam 1, you should take action to diagnose the reasons for your performance; instructors might be able to help. Students who ignore weak academic performance on exams usually earn poor grades in ECE 110; Students who address deficiencies in academic performance early usually do better in the remainder of ECE 110 and in later semesters.

## Getting Help

For general assistance with the undergraduate curriculum, visit the *ECE Department Advising Office* in the administrative suite room 2120 ECEB (for academic advice), the Center for Academic Resources in Engineering 4<sup>th</sup> floor of Grainger Library (CARE, for engineering-course-related help), or the campus's *Counseling Center* (for time management, study skills, test taking skills, and confidential personal counseling). For assistance in ECE110 specifically, please see your instructor or the course director.

## Disability Accommodations

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contract DRES, you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or email a message to [disability@uiuc.edu](mailto:disability@uiuc.edu).

## Other Policies

- ECE majors cannot drop ECE 110 without the permission of the ECE Advising Office.
- We expect you to conduct yourselves in accordance with the University's Student Code (see link on the course home page).

We welcome your suggestions to make **your** course better. Sign up for the ECE110 feedback committee.

## ECE 110 Introduction to Electronics

### Tentative COURSE SCHEDULE

**Review for Exam** days are optional, but highly recommended!

	Lecture	Homework	Lab
1	Definitions		LAB #1
2	Energy Storage	Online Reading	A Lab Course Introduction
3	Power and Energy	HW#1: Friday 3 pm	LAB #2
4	Modelling/Schematics		DC Circuits and Tools
	Labor Day		Lab #3
5	Kirchhoff's Laws	HW#2: Friday 3 pm	Exposure to Circuit Building
6	VDR and CDR	HW#3: Friday 3 pm	LAB #4
7	Sources and Power		DC Circuits and Kirchhoff
8	IV Characteristics	HW#4: Friday 3 pm	LAB #5
9	Thevenin/Norton		Time-Varying Circuit Tools
10	The Node Method	HW#5: Friday 3 pm	LAB #6
11	Intro to Diodes		Time-Varying Circuit Oscillator
12	Diode Circuits	HW#6: Friday 3 pm	LAB #7
13	Catchup and Examples		Modeling Real Devices
14	Review for Exam 2	HW#7: Friday 3 pm	LAB #8
15	Bipolar Junct Transistor		Semiconductor Devices
16	BJT IV Characteristic	HW#8: Friday 3 pm	LAB #9
17	Voltage Amplifier		Pulse-Width Modulation
18	Transistor Exercises	HW#9: Friday 3 pm	LAB #10
19	Field Effect Transistors		Control and Navigation
20	CMOS Logic	HW#10: Friday 3 pm	LAB #11
21	Catchup and Examples		Design Challenge
22	Review for Exam 3	HW#11: Friday 3 pm	LAB #12
23	Signals, Spectra, Noise		Design Challenge
	Fall Break	No Homework	No Labs this week.
24	Sampling	HW#12: Friday 3 pm	LAB #13
25	Preserving Info in A/D		Design Challenge
26	Quantifying Information	HW#13: Friday 3 pm	Design Challenge
27	Compression		Presentations
28	Photodiodes and Solar Panels	Mastery Exercises TBA	<b>James Scholars Honors Project Presentations (please come out to see!)</b>
29	Review Final Exam	(aids HW score)	

# General Emergency Response Recommendations

These recommendations are provided by the Office of Campus Emergency Planning. There are two basic methods to respond in emergencies that may affect persons on campus, and more specifically, individual buildings: Building Evacuation (**GET OUT**) and Shelter-In-Place (**STAY IN**).

**ONLY FOLLOW THESE ACTIONS IF SAFE TO DO SO.** When in doubt, follow your instincts - you are your best advocate!

**Building Evacuation (GET OUT)** — Action taken to leave an area for personal safety.

- Take the time to learn the different ways to leave your building **BEFORE** there is an emergency.
- Evacuations are mandatory for fire alarms and when directed by authorities! No exceptions!
- Evacuate immediately. Pull manual fire alarm to prompt a response for others to evacuate.
- Take critical personal items only (keys, purse, and outerwear) and close doors behind you.
- Assist those who need help, but carefully consider whether you may put yourself at risk.
- Look for **EXIT** signs indicating potential egress/escape routes.
- If you are not able to evacuate, go to an Area of Rescue Assistance, as indicated on the front page of this plan.
- Evacuate to Evacuation Assembly Area, as indicated on front page of this plan.
- Remain at Evacuation Assembly Area until additional instructions are given.
- Alert authorities to those who may need assistance.
- Do not re-enter building until informed by emergency response personnel that it is safe to return.

**Shelter-in-Place (STAY IN)** — Action taken to seek immediate shelter indoors when emergency conditions do not warrant or allow evacuation.

- Severe Weather
  - If you are outside, proceed to the nearest protective building.
  - If sheltering-in-place due to severe weather, proceed to the identified Storm Refuge Area or to the lowest, most interior area of the building away from windows or hazardous equipment or materials.
- Security Threat
  - If you cannot safely evacuate, find a secure area within your building to stay and await further information.
  - Assist those who need help, but carefully consider whether you may put yourself at risk.
  - Once within a safe place, attempt to secure the space (i.e.: lock doors, close windows/blinds).
  - If unable to lock the door, secure it by any means possible.
  - Remain quiet, unless making noise would be beneficial to your safety (i.e.: rescue recovery).
  - Without jeopardizing your safety, try to obtain additional clarifying information by all possible means, including the Illini-Alert Emergency Text Notification System.