



# ECE 110

## INTRODUCTION TO ELECTRONICS

SPRING 2019

### COURSE SYLLABUS

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

Introduction to selected fundamental concepts and principles in electrical engineering. Emphasis on measurement, modeling, and analysis of circuits and electronics while introducing numerous applications. Includes sub-discipline topics of electrical and computer engineering, for example, electromagnetics, control, signal processing, microelectronics, communications, and scientific computing basics. Lab work incorporates sensors and motors into an autonomous moving vehicle, designed and constructed to perform tasks jointly determined by the instructors and students. *Class Schedule Information:* Students must register for one lab and one lecture section. *Course Director:* C. D. Schmitz

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|------------------------|--|
| <b>Course Websites</b> | <a href="http://courses.engr.illinois.edu/ece110">http://courses.engr.illinois.edu/ece110</a><br><a href="https://piazza.com/illinois/spring2019/ece110">https://piazza.com/illinois/spring2019/ece110</a> |
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### Lecture Schedule

| Section | Days                                      | Time           |           | Instructor           | Email                 |
|---------|---|----------------|-----------|----------------------|-----------------------|
| AL4     | Mondays & Wednesdays                      | 9:00-9:50 am   | 2017 ECEB | Prof. Soo Choi       | hyungsoo@illinois.edu |
| AL1     |   | 10:00-10:50 am | 1002 ECEB | Prof. Chris Schmitz  | cdschmit@illinois.edu |
| AL3     | Beginning Monday, August 27 <sup>th</sup> | 2:00-2:50 pm   | 1015 ECEB | Prof. Jing Jiang     | jiang56@illinois.edu  |
| AL2     |   | 3:00-3:50 pm   | 1002 ECEB | Prof. Yun-Sheng Chen | yunsheng@illinois.edu |

### Laboratory Schedule

| Inclusive Dates  | Exclusive Dates  | Classroom  | Lab Director  |
|--|--|--|---------------|
| <b>Start:</b> Jan 14 (Mon)<br><b>End:</b> April 26 (Fri)   | Labs will <b>not</b> meet:<br>Spring and Fall Break or the week of MLK/Labor Day holiday | Texas Instruments Electronics Design Lab, 1001 ECE Building, enter through 1005 ECEB | Prof. Schmitz |
| <i>Notes:</i> Always read the laboratory assignment before your laboratory session. All of the lab sessions (except the first lab) include a <i>pre-lab</i> that you must complete before you go to your lab. Additional materials are at the course home page. All laboratory meetings are <b>mandatory</b> . See the absence policy. |  |  |               |

## Office Hours Schedule

| Regular Dates  | Classroom   | Reading Day   | Office Hours Contact   |
|--|---|---|--|
| <b>Start:</b> Tuesday, Jan 22<br><b>End:</b> Last Wed of term<br><b>Exception:</b> Break   | Texas Instruments<br>Electronics Design Lab<br>Lecture, 1005 ECEB | May 2 (Thursday)<br><i>A new schedule will be used from this date on.</i> | <a href="mailto:cdschmit@illinois.edu">cdschmit@illinois.edu</a> |
| <i>Notes:</i> The official office hour schedule will be posted at our course website.<br><i>Questions or concerns?</i> You may go to any office hours that fit in your schedule.<br>You <i>must</i> show your attempt in written form to receive office hour assistance on a specific problem! |   |   |  |

## Supervised Lab Playtime

Typically Saturday 12-3pm the lab is available for students to play with **Modules** and **projects**. A lab procedure may be made up on a Saturday session **only** if explicit permission has been given by the TA.

## 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 (~\$30). A car chassis will be distributed in lab free of charge.
- **i>clicker remote** to record responses to quizzes.
- **ECE 110 Class Notes** (FREE!) online textbook available at our website.

## Optional Course Materials

- **ECE110 Highly Recommended!** Arduino or RedBoard.
- **ECE110 Add-ons:** Hand-held multimeter, wire stripper, diagonal cutters, soldering iron.
- **Other texts** are on reserve at Grainger Library: See Suggested Reading on the course home page.

## Examinations: SELF-ARRANGED

| Exam 1   | Exam 2     | Exam 3     | Final Exam             | Location for all:                      |
|----------|------------|------------|------------------------|--|
| ~Mid Feb | ~Mid March | ~Mid April | May 2-8, not confirmed | Computer-Based Testing Facility (CBTF) |

The above dates are tentative only and are likely to change due with CBTF availability.

## Examination Policy

Midterm exams are self-arranged, 50-minute sessions, and taken at the Computer-Based Testing Facility (CBTF, 57 Grainger Library) over a period of several days. Final exams are likely to take place in various computer labs across campus. The scheduler app will be available for students to sign up for exams roughly two weeks in advance.

<https://cbtf.engr.illinois.edu/index.html> documents the CBTF for students as well as special instructions for DRES accommodations.

If you have an unavoidable medical or personal emergency, the course director can allow you to substitute the second-chance exam although any second-chance opportunity on that midterm is forfeited. To be eligible, you must notify your lecture instructor (**not** a TA) immediately, and you must document your absence as best you can.

## Homework

Homework problems are on-line through PrairieLearn. When you submit answers, they are graded immediately. There is no partial credit for homework completed after the deadline.

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| <b>HOMEWORK<br/>DEADLINE</b> | Homework will be due<br><b>Fridays at 3 pm</b><br>unless stated otherwise. |
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Students will **not** be reminded about due dates. A request for excused makeup **has never been 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:** Peer-team study (watch Piazza 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. Tutoring can also be arranged. Please contact the course director, Prof. C. Schmitz, [cgschmit@illinois.edu](mailto:cdschmit@illinois.edu).
- **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 Advisor and can be found in 2120 ECEB above Grainger Auditorium.

## Laboratory Attendance Policy

Labs **do not meet** during the week of Martin Luther King Day or Labor Day nor the week of Spring or Fall Break. **Otherwise**, laboratory attendance is **mandatory each and every week**. 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.

## Lecture Attendance Policy

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, chronic laziness, 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% each x 3 = 30%), 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, the design challenge, and effort.

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|-----------------|-----------------|-----------------|-----------------|---------------|
| <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 of 50% must be shown in both.

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| <b>Important<br/>Lecture/Lab<br/>Policy</b> | <b>A failing grade will be given to<br/>any student who does not score<br/>at least 50% in both the lecture<br/>and the lab separately.</b> |
|---|---|

After each hour exam, we hope to produce an **estimated course letter grade** for each student, 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 are there 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 determine if you qualify for 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 contact 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.
- Plagiarism will not be tolerated in any form. Submit your own work while documenting the sources of any outside materials used in producing your reports (including figures, programming code, schematics, data, and even text from your own previous projects) so that grading can be done according to your contribution without ambiguity. Honors students may not “double dip” on their projects.
- 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.

## ECE 110 Introduction to Electronics Tentative COURSE SCHEDULE

|    | Lecture                      | Homework           | Lab  |
|----|------------------------------|--------------------|--|
| 1  | Definitions                  | Online Reading     | LAB #1   |
| 2  | Energy Storage               |                    |  |
|    | <b>Holiday</b>               |                    | <b>No Labs this week</b>   |
| 3  | Power and Energy             | HW#1: Friday 3 pm  |  |
| 4  | Modelling/Schematics         |                    | LAB #2   |
| 5  | Kirchhoff's Laws             | HW#2: Friday 3 pm  |  |
| 6  | VDR and CDR                  |                    | Lab #3   |
| 7  | Sources and Power            | HW#3: Friday 3 pm  |  |
| 8  | RMS and Power                |                    | LAB #4   |
| 9  | IV Characteristics           | HW#4: Friday 3 pm  |  |
| 10 | Thevenin/Norton              |                    | LAB #5   |
| 11 | The Node Method              | HW#5: Friday 3 pm  |  |
| 12 | Exercises                    |                    | LAB #6   |
| 13 | Intro to Diodes              | HW#6: Friday 3 pm  |  |
| 14 | Diode Circuits               |                    | LAB #7   |
| 15 | Exercises                    | HW#7: Friday 3 pm  |  |
| 16 | Bipolar Junct Transistor     |                    | LAB #8   |
| 17 | BJT IV Characteristic        | HW#8: Friday 3 pm  |  |
|    | <b>Break</b>                 | <b>No Homework</b> | <b>No Labs this week.</b>  |
| 18 | Voltage Amplifier            |                    | LAB #9   |
| 19 | Exercises                    | HW#9: Friday 3 pm  |  |
| 20 | Field Effect Transistors     |                    | LAB #10  |
| 21 | CMOS Logic                   | HW#10: Friday 3 pm |  |
| 22 | Signals, Spectra, Noise      |                    | LAB #11  |
| 23 | Sampling                     | HW#11: Friday 3 pm |  |
| 24 | Preserving Information       |                    | LAB #12  |
| 25 | Quantifying Information      | HW#12: Friday 3 pm |  |
| 26 | Compression                  |                    | Design Challenge<br>Presentations  |
| 27 | Exercises                    | HW#13:             |  |
| 28 | Photodiodes and Solar Panels | Wed 11:59:59 pm    | <b>James Scholars Honors<br/>Project Presentations<br/>(please come out to see!)</b> |
| 29 | <b>Course Review</b>         | Mastery Exercises  |  |

## Run > Hide > Fight

Emergencies can happen anywhere and at any time. It is important that we take a minute to prepare for a situation in which our safety or even our lives could depend on our ability to react quickly. When we're faced with almost any kind of emergency – like severe weather or if someone is trying to hurt you – we have three options: **Run, hide or fight.**



### Run

**Leaving the area quickly is the best option if it is safe to do so.**

- ▶ Take time now to learn the different ways to leave your building.
- ▶ Leave personal items behind.
- ▶ Assist those who need help, but consider whether doing so puts yourself at risk.
- ▶ Alert authorities of the emergency when it is safe to do so.

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|--------|---|
| Run... | <ul style="list-style-type: none"><li>• Away from Danger!</li><li>• Grassy Area East of ECEB</li><li>• Beckman Institute Atrium</li></ul> |
|--------|---|



### Hide

**When you can't or don't want to run, take shelter indoors.**

- ▶ Take time now to learn different ways to seek shelter in your building.
- ▶ If severe weather is imminent, go to the nearest indoor storm refuge area.
- ▶ If someone is trying to hurt you and you can't evacuate, get to a place where you can't be seen, lock or barricade your area if possible, silence your phone, don't make any noise and don't come out until you receive an Illini-Alert indicating it is safe to do so.

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|---------|--|
| Hide... | <ul style="list-style-type: none"><li>• Desk</li><li>• Bathroom</li><li>• Office</li></ul> |
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### Fight

**As a last resort, you may need to fight to increase your chances of survival.**

- ▶ Think about what kind of common items are in your area which you can use to defend yourself.
- ▶ Team up with others to fight if the situation allows.
- ▶ Mentally prepare yourself – you may be in a fight for your life.

Please be aware of people with disabilities who may need additional assistance in emergency situations.

### Other resources

- ▶ [police.illinois.edu/safe](http://police.illinois.edu/safe) for more information on how to prepare for emergencies, including how to run, hide or fight and building floor plans that can show you safe areas.
- ▶ [emergency.illinois.edu](http://emergency.illinois.edu) to sign up for Illini-Alert text messages.
- ▶ **Follow the University of Illinois Police Department** on Twitter and Facebook to get regular updates about campus safety.