# University of California, Santa Cruz – Summer 2023
# Jack Baskin School of Engineering
# Department of Electrical and Computer Engineering

## ECE 101 – Introduction to Electronic Circuits
## Course Units: 5.00


**Professor:** Dr. Austin Chen
**Office:** E2-237B
**E-Mail:** achen139@ucsc.edu

**Class Schedule:** Tue/Thur 4:45 pm – 8:15 pm, BE-152
**Office Hours:** Email or after class

### I - COURSE DESCRIPTION
Introduction to the theory and analysis of electrical circuits; basic circuit elements including the operational amplifier, circuit theorems (KVL, KCL), dc circuits, forced and natural responses of simple circuits, and sinusoidal steady state analysis. A variety of linear circuit analysis techniques will be emphasized and treated. Consideration is given to power, energy, impedance, phasors, frequency response and their use in circuit design.

### II - TEXTBOOK (Required)
Circuit Analysis and Design by Ulaby, Maharbiz, and Furse
Ebook: http://cad.eecs.umich.edu (free for download)

**Additional Reference:**
PSpice for Basic Microelectronics (1st edition 2008) by Joseph Tront

### III - SOFTWARE
Matlab
PSpice (for virtual lab only)

### VI - Prerequisite by Topic
Students should have already taken PHYS 5C and PHYS 5N; or PHYS 6C and PHYS 6N; and MATH 24 or previous or concurrent enrollment in AM 20. Concurrent enrollment in ECE 101L is required. Should you have any questions or concerns pertaining to your background, please contact your instructor.

### V - GRADING POLICY

| | |
|---|---|
| Homework (selectively collected) | 10% |
| Midterm | 35% |
| Final | 45% |
| Attendance, class etiquette, and pop quiz | 10% |

**Letter Grade (Tentative)**

| | |
|---|---|
| $X \geq 85$ | A |
| $80 \leq X < 85$ | A- |
| $75 \leq X < 80$ | B+ |
| $70 \leq X < 75$ | B |
| $65 \leq X < 70$ | B- |
| $60 \leq X < 65$ | C+ |
| $55 \leq X < 60$ | C |
| $50 \leq X < 55$ | C- |
| $45 \leq X < 50$ | D |
| $X < 45$ | F |

## VI - CLASS POLICIES AND PROCEDURES

### *Attendance:*

The class will be taught synchronously and there will be no recording of the lecture. Students are expected to attend every lecture. Students are responsible for arriving before the class begins, and remaining for the duration of the course meeting. If a student misses a class, it is his/her responsibility to find out what was discussed in class, any homework assigned or exam scheduled.

### *Homework (Selectively Collected) and Make-up Exam:*

No late homework is accepted. **Absolutely** no make-up exam will be given.

### *Homework:*

Homework will be assigned on a regular basis (~9 HWs), approximately two sets per week. Homework must be turned in on 8.5"X11" paper written on one side with the necessary information such as Name, ID#, Course #, Homework # and date on top right hand corner of the first page.

### *Examination Dates:*

Midterm Exam: 7/13/2023 (class time)
Final Exam: 7/27/2023 (class time)

**The exam is closed book and closed notes.**

### *Academic Integrity:*

Ideas and learning form the core of the academic community. In all centers of education, learning is valued and honored. No learning institution can thrive if its members counterfeit their achievement and seek to establish an unfair advantage over their fellow students. The Academic Integrity is designed to foster a fair and impartial set of standards. All students are required to adhere to these standards. Any dishonest act such as copying, plagiarism, lying, unauthorized collaboration, alteration of records, bribery, and misrepresentation for the purpose of enhancing one's academic standing results in a failing grade for the entire course and will be reported to the College as well as the Dean of Students.

## VII - COURSE AGENDA

| Week | Date | Topic | Lab |
|---|---|---|---|
| 1 | 27-June | Course Introduction, circuit elements, Kirchoff's laws, Ohm's law, series/parallel circuits, voltage and current division, nodal and mesh analysis | |
| 1 | 29-June | Superposition, source transformation, Thevenin and Norton equivalent circuits, maximum power transfer theorem | Lab 1 (6/30): Orientation and fundamental circuit theory |
| 2 | 4-July | **Independence Day (no class)** | |
| 2 | 6-July | Review of reactive elements (inductor and capacitor), operational amplifiers | Lab 2: (7/7) Thevenin/Norton equivalent circuits and maximum power transfer |
| 3 | 11-July | First-order RC and RL circuits, midterm review | |
| 3 | 13-July | **Midterm Exam** | Lab 3 (7/14): Single time-constant circuits |
| 4 | 18-July | Second-order RLC circuits | |
| 4 | 20-July | Impedance and admittance, sinusoidal steady-state analysis (AC/phasor) | Lab 4 (7/21): Second-order RLC circuits and AC/phasor |
| 5 | 25-July | Introduction to frequency response (Bode plot) and filter, final review | |
| 5 | 27-July | **Final Exam** | |

**Considering the course schedule and material, weekly recitation sessions will be conducted by your TAs to cover certain supplementary topics and reinforce the key concepts.**

**The Content of the Course Syllabus is Subject to Change with Appropriate Notice to the Students**