**Course Name:** Electronics I, EE 230  
**Instructor:** Loren Betts  
E-mail: loren.betts@sonoma.edu  
Course page: [https://canvas.instructure.com/courses/1102724](https://canvas.instructure.com/courses/1102724)

Class Schedule (Salazar 2009A): Tuesday/Thursday: 5:30pm to 6:45pm.

Office Hours: By Appointment.

**Course Description:** Theory, characteristics and operation of operational amplifiers, diodes and MOSFET transistors.

**Text Book:** *Microelectronic Circuits*, Adel S. Sedra, Kenneth C. Smith, 5\textsuperscript{th} edition (other editions fine as well).

**Assignments:** On the day that the assignment is due, please bring the completed problems with you. Assignments are due at the beginning of lecture and no late assignments will be accepted. Please show all work!

**Labs:** None.

**Exams:** There will be one mid-term exam and one final exam. See the Canvas schedule of homework assignments for the due dates and the chapters covered for each exam.

**Canvas:** I am not normally located on campus, so Canvas will be a great resource for this class. I will post homework assignments, homework solutions, lecture notes, calendar information, and additional resources on this website. It is required that you use Canvas. It will be the primarily location for class announcements, schedule changes, etc. If you have not received an invitation from me, please let me know immediately.

**Grade:**  
Assignments 40%  
Mid-term Exam 30%  
Final exam 30% (The final will cover all topics)
Class Outline: Here is a rough outline of the units we will be covering. These are subject to change.

1. Definition of Units
2. Review of Kirchhoff’s Voltage and Current Laws (KVL, KCL)
3. Review of Circuit Elements (Resistors, Capacitors, Inductors)
4. Signals and Amplifiers (Chapter 1)
5. Operational Amplifiers (Chapter 2)
6. Diodes (Chapter 4)
7. MOS Field-Effect Transistors (MOSFET) (Chapter 5)
8. Bipolar Junction Transistors (Chapter 6)

No classes: March 13 - 17 (Spring break)
March 31 (Cesar Chavez day)

Key Dates: TBD (Mid-term exam)
May 12 (Last day of classes)
TBD (Final exam)
Course Learning Objectives (CLO):

1. Learn how semiconductors operate and the use of a pn-junction
2. Learn how to characterize the electronic components including op amps, diodes, MOS transistors, bipolar junctions transistors and their applications
3. Learn how to analyze and design electronic circuits containing resistors, capacitors and the above electronic components
4. Learn how to calculate the gain and frequency response of an amplifier
5. Learn how to design an amplifier for desired gain and frequency response

Course Outcomes (CO):

1. Know how to calculate the voltage, current and gain in a circuit containing an amplifier
2. Know how to use op-amps to design amplifiers to a desired specification
3. Know how to calculate the current and other figures-of-merit in a semiconductor
4. Know how to design circuits using a diode
5. Know how to design an amplifier circuit utilizing a MOSFET
### EE 230 – Spring 2017

**Student Learning Outcomes vs. Course Learning Objectives:**
(Support Level (0-5) 0=No support, 1=lowest support, 5=highest support)

<table>
<thead>
<tr>
<th>ABET Student Outcomes</th>
<th>CLOs</th>
<th>Level of Support</th>
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<tbody>
<tr>
<td>(a) an ability to apply knowledge of mathematics, science, and engineering</td>
<td>1, 2, 3, 4</td>
<td>4</td>
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<td>(b) an ability to design and conduct experiments, as well as to analyze and interpret data</td>
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<td>(c) an ability to design a system, component, or process to meet desired needs</td>
<td>3, 4, 5</td>
<td>3</td>
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<td>(d) an ability to function on multi-disciplinary teams</td>
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<td>(e) an ability to identify, formulate, and solve engineering problems</td>
<td>2, 3, 4</td>
<td>4</td>
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<td>(f) an understanding of professional and ethical responsibility</td>
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<td>(g) an ability to communicate effectively</td>
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<td>(h) the broad education necessary to understand the impact of engineering solutions in a global and societal context</td>
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<td>(i) a recognition of the need for, and an ability to engage in life-long learning</td>
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<td>(j) a knowledge of contemporary issues</td>
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<td>(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</td>
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<td>(l) a knowledge of probability and statistics, including applications appropriate to Electrical Engineering program</td>
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<td>(m) a knowledge of advanced mathematics through differential and integral calculus, linear algebra, complex variables, and discrete mathematics</td>
<td>1, 2, 3, 4</td>
<td>3</td>
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<tr>
<td>(n) a knowledge of basic sciences, computer science, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components, as appropriate to Electrical Engineering program</td>
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**Assessment Methods:**

Assessment of the student learning
1. Student assignments
2. Quizzes, Midterm and Final exams

Course quality Assessment
1. Student survey of the course
2. Peer instructors feedback