San Jose State University
Aviation and Technology Department
Tech 060: Introduction to Electronics, spring 2017

Instructor: Manizheh Zand
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Office Hours: Fri 9:00 am – 9:30 am

                           Fri 5:45 pm -6:30 pm

Classroom: Lecture: IS 216, F 9:30 am-11:15 am

                           Lab: IS 117, F 12:00 pm-2:45 pm, 3:00 pm -5:45 pm

Prerequisites: Math 71 or 30 or 30P or equivalent

Course and Contact Information

Emphasizes practical electronics applications and products. DC and AC theory; Ohm's Law, Kirchhoff's Laws, Power Laws, network theorems, schematic diagrams, instrumentation and measurement, and functions of discrete components.

Course Objectives

Upon successful completion of this course, students will be able to:

- Develop an understanding and working knowledge of the fundamentals of DC and AC theory and theorems.
- Define current, voltage, and Kirchhoff's current and voltage laws.
- Use voltage and current to calculate power dissipated by devices in a circuit.
- Use Ohm's law to determine voltage and current relationship in linear devices.
- Analyze series, parallel, series-parallel, and network circuits
- Apply the principle of superposition, Thevenin's equivalent circuits, and Norton's equivalent circuits.
- Analyze circuits containing independent current and voltage sources.
- Describe the properties of inductors, capacitors and obtain transient responses of circuits containing these elements.
- Identify the amplitude, frequency, and phase of a sinusoidal function.
- Transform sinusoidal current and voltage signals from time domain to frequency domain.

- Use the phasor concept to obtain solution of first and second order transient and steady state circuits.
- Use laboratory tools such as oscilloscopes, multimeters, function generators, and power supplies.
- Assemble a circuit and perform voltage and current measurements.
- Perform a critical evaluation of the differences between analytical solutions and the experimental measurements.

Textbooks

Floyd, Thomas L. (2013). Principles of Electric Circuits. (9th Edition). Upper Saddle River, New Jersey: Prentice-Hall.

Required

Starting this semester, every student must have his/her multimeter and a breadboard with jumper wires.

Please make sure that have your kit by the end of the first week of the spring semester.

One of my students from last semester recommended the following kit from amazon:

https://www.amazon.com/Elegoo-Electronics-Potentiometer-tie-points-Breadboard/dp/B01ERPEMAC/ref=sr_1_5?s=electronics&ie=UTF8&qid=1481306351&sr=1-5&keywords=elegoo (Links to an external site.)

Elegoo Upgraded Electronics Fun Kit w/ Power Supply Module, Jumper Wire, Precision Potentiometer, 830 tie-points Breadboard for Arduino, Raspberry Pi, STM32
by Elegoo (Links to an external site.)

The following multimeter is recommended by one of the facilities:

1286-1076-ND http://www.digikey.com/product-detail/en/digilent-inc/480-001/1286-1076-ND/4090113 (Links to an external site.) $32.99

The above kit and the multimeter are only recommendations. For my class, you only need a medium size breadboard with some jumper wires and a simple multimeter. You could buy them from anywhere. However, keep in mind that some purchases from overseas, especially China, takes more than a month. You must have your kit and the multimeter by the end of the first week. This is your investment that you would be using for the rest of your academic years and beyond at our department. You may also want to consider a component case carry box, which is absolutely optional.

Course Evaluation

The total points earned on all the midterms, quizzes, assignments, lab assignments, project, and final exam will be divided by the total possible points and the resulting percentage will determine the course grade.

Midterms 40%
Homework Assignments/Quizzes 10%
Lab Experiments 20%
Project 10%
Final exam 20%

The final grade will be determined according to the following scale:

A+ 97 -100%   B+ 87 - 89%   C+ 77 - 79%   D+ 66 - 69%
A 93 - 96%   B 83 - 86%   C 73 - 76%   D 60 - 65%
A- 90 - 92%   B- 80 - 82%   C- 70 - 72%   F 0 - 59%

I. **Midterms & Quizzes**

There will be two (2) midterms given during the semester on the following weeks: Midterm #1 - 5th week (on week's 1 – 6 materials); Midterm #2 - 10th week (on weeks 7 - 9 materials). Final Comprehensive Exam will be given during final exam period. No makeup will be allowed. On a midterm day, students are excused when they are finished with the exam. The following lab will still be attended. Midterms will allow calculators and student prepared notebooks. The lab book and text book and professor lecture slides will not be allowed unless incorporated into a student's notebook. Students are encouraged to build an engineering notebook as the course develops and to include useful items such as the resistor color code, formulas, and wire tables.

There will be several quizzes given during the semester as deemed necessary. No makeup will be allowed.   Quizzes will be given when appropriate and may be given in a lab session. Beware, attendance is required at the start of lab sessions although students may be excused when the lab work is complete. Quiz topics are listed as follows:

1. Scientific and engineering numerical notation
2. Energy and Power dissipation
3. Series and Parallel Equivalent values
4. Circuit Theorems and Conversions
5. Branch, Loop, and Node Analysis
6. Alternating Current
7. Inductors
8. Capacitors

II. **Homework Assignments**

Homework will be assigned during class hours and can be given from textbooks or from class discussions. The assignments for homework will be posted on Canvas as will all class presentations

III. **Lab Experiments**

You are expected to conduct a number of lab experiments which includes analyzing circuit both on breadboard and multisim. It is your responsibility to do a conscious and thorough job in a professional manner.

IV. **Final Exam**

Wednesday, May 24th , 2017 7:15 AM - 9:30 AM Rm 216.

Academic Integrity:

Your own commitment to learning, as evidenced by your enrollment at San Jose State University, and the university's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Conduct and Ethical Development. The policy on academic integrity can be found at http://sa.sjsu.edu/student_conduct.

Cell phones, text messaging, e-mail and Internet:

1. As a courtesy to the students and the instructor, all cell phones must be turned off during class and lab sessions. This includes all silent operation modes. It is not only the disturbance caused by the ringing of cell phones that interferes with class activities, but also the disturbance caused by students leaving the class to answer messages or return calls. Turned off = airplane mode if so equipped, ring silent, and screen dark. Phone should be put away in a back pack under the seat. If a genuine emergency exists such that a cell phone must be monitored, see the instructor about this before class. Be prepared to exit the class should the emergency arise.
2. The use of computers/tech products is restricted to the tasks assigned in class. Calculators will be allowed in class and on all exams. A student's personal notebook may be used and may include anything from the class provided that it is bound into the notebook. Not fair to collect pages into a folder. If you see something useful that you want to use in an exam, make a hard copy, clip it and paste it into your notebook. Talking, lecture slides, internet, and textbooks will not be allowed on exams. Internet surfing as well as monitoring and replying to e-mail is a distraction for everyone. Class notes from the instructor will be provided on CANVAS after or at the same time as lectures. (I will try to provide these before class). It is not anticipated that students in a technical course will attempt/need to use a keyboard during class lecture, however if this changes the instructor will allow provisions for this in class. The presence of computers and or tech products such as smart phones, watches and the like are not allowed during quizzes, midterms or the final exam. The appearance of these items during quizzes or exams will be considered a violation of the school academic integrity program.
3. Students who disrupt the class and do not stop when requested by the instructor will be referred to the SJSU Office of Student Conduct and Ethical Development.
4. Finally, note that test material will be over items presented in class, from instructor hand-outs, and from past exams and homework assignments. Thus, problems from the textbook are fair game but obscure material that is skipped is not.

Americans with Disabilities Act:

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If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability.

Course Outline

Week	Date	Lecture	Lecture Topics	Lab
1	Jan 27th	Ch 1,2	Orientation, Units, Notation, Current, Voltage, and resistance	Purchase status on lab kit
2	Feb 3rd	Ch 3,4	Ohm's law, Energy and Power	Lab kit is due Will work on multimeters
3	Feb 10th	Ch 5,6	Series circuits, Parallel circuits	Multisim
4	Feb 17th	Review Ch 1-6		Parallel circuit
5	Feb 24th	Midterm #1	Ch 1-6	Series circuit
6	Mar 3rd	Ch 7	Series and Parallel Circuits	
7	Mar 10th	Ch 8	Circuit Theorems and Conversions	Superposition
8	Mar 17th	Ch 9	Branch, Loop, and Node Analysis	Thevenin
9	Mar 24th	Review	Ch 5-9	Start working on the project
10	Mar 31th	Spring Break	No school	Wheatstone bridge
11	Apr 7th	Midterm #2	Ch 5-9	
12	Apr 14th	Ch 10	Magnetism and Electromagnetism	Norton
13	Apr 21st	Ch 11	Introduction to Alternating Current and Voltage	Oscilloscope
14	Apr 28th	Ch 12	Capacitors	Capacitor
15	May 5th	Ch 13	Inductors	Project status report
16	May 12th	Review		Project presentation due
	May 24th	Final	Final Exam 7:15 - 9:30	