

San José State University
Department of Aviation & Technology
Tech 62 Analog Circuits, Section 01, Fall 2016

Course and Contact Information

Instructor:	Dr. Julio R. Garcia
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Office Hours:	MW: 1430 – 1530
Class Days/Time:	MW 1330 - 1415
Classroom:	ENG 329
Prerequisites:	TECH 060 and MATH 071 or MATH 030

Course Format

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found r on [Canvas Learning Management System course login website](http://sjsu.instructure.com) at <http://sjsu.instructure.com>.

Course Description

Semiconductor theory; p-n junction, bipolar transistors, JFETs and MOSFETs, optoelectronic devices. Operational amplifiers and 555 timers. Device applications: comparators, signal generators, active filters, instrumentation amplifiers, voltage regulators and power supplies. Prerequisites: TECH 060 and MATH 071 or MATH 030.. Activity 6 hrs, 3 units

Course Learning Outcomes (CLO)

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

1. Describe the fundamentals of semiconductor diodes, transistors, op-amps, timers, and oscillators.
2. Describe the fundamentals of semiconductor diodes, transistors, op-amps, timers, and oscillators.

3. Describe the fundamentals of semiconductor diodes, transistors, op-amps, timers, and oscillators.
4. Build, identify, and analyze diode circuits, transistor circuits, op-amp circuits, active filters, and oscillators.
5. Design or modify fundamental electronic circuits to meet certain requirements.

Required Texts/Readings

Textbook

Floyd, Thomas L. (2012). Electronic Devices. Conventional Current Version. 9th Ed. Upper Saddle River, NJ: Prentice Hall. ISBN- 13: 9780132549868. Available at Spartan Bookstore/

Course Requirements and Assignments

Class Participation

Students working in groups of 2-3 will solve Problems Sets (assigned problems from each chapter) posted on [Canvas](https://sjsu.instructure.com) (<https://sjsu.instructure.com>). Click on the **Modules** tab. You need to include the question and the answer. The answers should be easy to follow. The whole class will check/discuss if the answers are correct before submitting them. This group discussion will reinforce and/or enhance your analog circuits' knowledge.

When the Group has determined that their answers are correct then each Group will submit their answers via [Canvas](https://sjsu.instructure.com) (<https://sjsu.instructure.com>). **One report per group**. Click on the **Assignments** tab for submission. **Only the students whose names are indicated on the group report will get the credit..**

Class Participation contributes to CLOs 4 and 5, learning the fundamental concepts of analog circuits, developing teamwork skills and discussing the course material. Class Participation must be submitted by the due date indicated on the greensheet and has a weight of 15% of the final grade.

Lab experiments

You will complete lab assignments individually using the Multisim software. In addition you will hardware 4 lab experiments and will compare the measurements obtained using real instruments with the ones obtained using Multisim. The written reports will be submitted one week after the date of the assigned lab. Lab experiments contribute to CLOs 2, 4 and 5, reinforcing the course material and developing teamwork skills. Lab experiments have a weight of .30% of the final grade.

Tests

You will take weekly take-home quizzes, two midterms and the final exam. Tests will start and end at the scheduled time. These tests contribute to CLOs 1, 2 and 3 as well as reinforcing the learning of the fundamental concepts of analog circuits. The weight of the tests for the final grade are 15% for the weekly quizzes, 20% for midterms and 20% for the final exam.

Weekly Take-home Quizzes

You will download and print the weekly take-home Quizzes posted on [Canvas](https://sjsu.instructure.com) (<https://sjsu.instructure.com>). Click on the **Modules** tab.

You can work in groups but each student must submit his/her own quiz via [Canvas](https://sjsu.instructure.com) (<https://sjsu.instructure.com>) on or before the due date. Click on the **Assignments** tab.

Final Examination

Final Exam will be taken Thursday, December 15 from 1215 to 1430..

Grading Information

Weekly Take-home Quizzes, midterms and final exam will be graded based on the followed process and accurate answers. Class Participation will be evaluated based on the followed process and percent of accurate responses provided. Lab experiments grade will be determined on the percent of lab assignments completed on or before the due date..

Determination of Grades

Grades will be determined based on your performance in Lab experiments, Class Participation, Weekly Quizzes, Midterms and Final Exam. The final grade for the course will be based on the following items and weights::

Lab experiments	30%
Class participation	15%
Weekly Quizzes	15%
Midterms (2)	20%
Final Exam	20%

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

A+ = 96 - 100%	A = 93 - 95.9%	A- = 90 - 92.9%	B+ = 87 - 89.9%
B = 83 - 86.9%	B- = 80 - 82.9%	C+ = 77 - 79.9%	C = 73 - 76.9%
C- = 70 - 72.9%	D+ = 66 - 69.9%	D = 60 - 65.9%	F = 0 - 59.9%

Tech 62 - 40% of the Final Exam (Optional)

Students have the opportunity to answer the questions on the **Tech 62 - 40% of the Final Exam** posted on [Canvas](https://sjsu.instructure.com) (<https://sjsu.instructure.com>). Click on the **Modules** tab..

Students working in teams from 2 to 3 members will submit their answers by the last day of instruction (**Dec 12, 2016**). Each Group will submit their answers via [Canvas](https://sjsu.instructure.com) (<https://sjsu.instructure.com>). Click on the **Assignments** tab. **Only the indicated students will get the credit.**

It is strongly recommended that you take advantage of this opportunity for the following reasons:

1. This Extra Credit is worth **40%** of the Final Exam. These are the two options:
 - a. A group of 2-3 students submit the **Tech 62 - 40% of the Final Exam** and get 100. In the Final Exam one of the members get 70. The final exam grade for this student will be:

$$100 * 40\% = 40$$

$$70 * 60\% = 42$$

$$\text{Total} = 82$$

- b, A group of 2-3 students **do not** submit the **Tech 62 - 40% of the Final Exam** and one of the members get 70. The final exam grade for this student will be:**only 70.**

2. You will learn more and retain the material longer.
3. You will gain the ability of working effectively as a team member.
4. Some questions for the quizzes, Midterms and Final Exam will come from the **Tech 62 - 40% of the Final Exam.**
5. It is strongly recommended that you work on this **40% of the Final Exam** on a weekly basis and not wait until the last minute.

Only the students whose names are indicated on the group report will get the credit.

1. Check continuously your standing in the class on [Canvas](https://sjsu.instructure.com) (<https://sjsu.instructure.com>). Notify the instructor immediately if there is an error in any of your grades. **You have up to 7 calendar days** to notify the instructor if your grade is missing or has been recorded incorrectly. ***The last day to correct any discrepancy is the last day of instruction (December 12, 2016).*** There will be no change in your grade after the final grade has been submitted to the university.
2. All late assignments submitted up to 7 calendar days after the due date and time will have a penalty of 50%.
3. **Assignments submitted after 7 calendar days of the due date will not be accepted and they will be recorded as 00.**
4. The last day to submit assignments is December 12, 2016.

5. In all **Group Assignments** only **one report** needs to be submitted by a designated member of the group. Make sure that all members of the group are mentioned in the report. **Only the students whose names are indicated on the group report will get the credit.**
6. Any email sent to the instructor requesting him to violate any of these ground rules or to improve your final grade because you need 0.1 point to improve from C+ to B-, do not want to repeat the class or are at risk of being disqualified from the university, etc. **will not be considered.**

Classroom Protocol

1. You are expected to attend all meetings for the course as you are responsible for material discussed therein, and active participation is frequently essential to ensure maximum benefit to all class members. Attendance is fundamental to course objectives; for example, you may be required to interact with others in the class.
2. Download, print, read and bring the assigned Chapter handout 2016 posted on [Canvas](https://sjsu.instructure.com) (https://sjsu.instructure.com). Click on the **Modules** tab.
3. You will study the assigned chapter/material before coming to lecture by watching the assigned videos, reading the textbook and reviewing the PowerPoint presentation posted on [Canvas](https://sjsu.instructure.com) (https://sjsu.instructure.com). Click on the **Modules** tab.
4. After reviewing the chapter materials you will answer the Problem Sets (assigned problems at the end of the chapter) posted on [Canvas](https://sjsu.instructure.com) (https://sjsu.instructure.com). Click on the **Modules** tab. .
5. Instructor will explain key points and answer questions from students. Instructor may add related material to enrich the course content.
6. Instructor will become more as a facilitator of learning. This means that the instructor will provide as much individual or group assistance as needed.
7. Students should work and learn in teams. This is very important to be successful in the real world.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

Tech 62 Analog Circuits, Fall 2016 Course Schedule

Course Schedule**

Session	Date	Topics, Readings, Assignments, Deadlines
1	Aug 24	<p>Introduction/Orientation/Greensheet Email Proof of completion of course prereq (Tech 60 or equivalent and MATH 71 or MATH 30) by 8/29</p> <p><i>Prepare in advance for the next session:</i> Download, print, read and bring Chapter 4 handout 2016 from Canvas. Modules tab. Watch video: http://www.youtube.com/watch?v=-td7YT-Pums&feature=related Read Chapter 4: 4-1: BJT Structure 4-2: Basic BJT Operation 4-3: BJT Characteristics And Parameters 4-4: The BJT As An Amplifier 4-5: The BJT As A Switch Answer Problems Set 1</p>
2	Aug 29, 31	<p>Discuss Chapter 4 Email Proof of completion of course prereq (Tech 60 or equivalent and MATH 71 or MATH 30) by 8/29 Finish Problems Set 1</p> <ul style="list-style-type: none"> • Submit Weekly Quiz 1 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 9/1! Individual submission. <p><i>Prepare in advance for the next session:</i> Download, print, read and bring Chapter 5 handout 2016 from Canvas. Modules tab. Watch video: https://www.youtube.com/watch?v=WLYc6oD2BYA Read: 5-1: The DC Operating Point 5-2: Voltage Divider Bias 5-3: Emitter, Base, Emitter-Feedback And Collector-Feedback Biasing Answer Problems Set 2</p>
3	Sep 5	Labor Day. Campus closed
4	Sep 7, 12	<p>Discuss Chapter 5 Finish Problems Set 2 Submit Problems Set 1 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 9/13! Group submission. Only the indicated students will get the credit.</p> <p>Submit Weekly Quiz 2 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 9/13! Individual submission</p> <p><i>Prepare in advance for the next session:</i> Download, print, read and bring Chapter 6 handout 2016 from Canvas. Modules tab. Read 6-1: Amplifier Operation Watch video: http://www.youtube.com/watch?v=-LPALAwcYkg Read 6-2: Transistor AC Models</p>

Session	Date	Topics, Readings, Assignments, Deadlines
		<p>Watch video: https://www.youtube.com/watch?v=Pkjin18Ekjic</p> <p>Read 6-3: The Common-Emitter Amplifier Read 6-4: The Common-Collector Amplifier Answer Problems Set 3</p>
5	Sep 14, 19, 21	<p>Discuss Chapter 6 Finish Problems Set 3 Submit Problems Set 2 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 9/22! Group submission. Only the indicated students will get the credit.</p> <p>Submit Weekly Quiz 3 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 9/22! Individual submission</p> <p>Read and bring Chapter 6 handout 2016 from Canvas. Modules tab. Read in advance for the next session: 6-5: The Common-Base Amplifier 6-6: Multistage Amplifiers Answer Problems Set 4</p>
6	Sep 26, 28	<p>Discuss Chapter 6 Finish Problems Set 4 Submit Problems Set 3 via Canvas, Click on the Assignments tab. Due by 11:00 pm on 9/29! Group submission. Only the indicated students will get the credit.</p> <p>Submit Weekly Quiz 4 via Canvas.) Click on the Assignments tab. Due by 11:00 pm on 9/29! Individual submission</p> <p>Prepare in advance for the next session: Download, print, read and bring Chapter 8 handout 2016 from Canvas. Modules tab. Read 8-1: The JFET Watch video: http://www.youtube.com/watch?v=BzsXNhgVC0 Read 8-2: JFET Characteristic and Parameters Read 8-3: JFET Biasing Read 8-4: The Ohmic Region Answer Problems Set 5</p>
7	Oct 3, 5	<p>Discuss Chapter 8 Finish Problems Set 5 Submit Problems Set 4 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 10/6! Group submission. Only the indicated students will get the credit.</p> <p>Submit Weekly Quiz 5 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 10/6! Individual submission</p> <p>Prepare for Midterm 1 You can use schematic diagrams and equations only. No text is allowed such as If resistor shorts it is 0, etc.</p>
8	Oct 10, 12	Catch Up

Session	Date	Topics, Readings, Assignments, Deadlines
9	Oct 17	<p>Midterm 1</p> <p><i>Prepare in advance for the next session:</i></p> <p>Download, print, read and bring Chapter 9 handout 2016 from Canvas. Modules tab.</p> <p>Read 9-1: The Common-Source Amplifier</p> <p>Read 9-2: The Common-Drain Amplifier</p> <p>Read 9-3: The Common-Gate Amplifier</p> <p>Answer Problems Set 6</p>
10	Oct 19, 24	<p>Discuss Chapter 9</p> <p>Finish Problems Set 6</p> <p>Submit Problems Set 5 via Canvas Click on the Assignments tab. Due by 11:00 pm on 10/25! Group submission. Only the indicated students will get the credit.</p> <p>Submit Weekly Quiz 6 via Canvas Click on the Assignments tab. Due by 11:00 pm on 10/25! Individual submission</p> <p>Download, print, read and bring Chapter 10 handout 2016 from Canvas. Modules tab..</p> <p><i>Read in advance for the next session:</i></p> <p>10-3: Low-Frequency Amplifier Response</p> <p>10-4: High-Frequency Amplifier Response</p> <p>10-5: Total Amplifier Frequency Response</p> <p>Answer Problems Set 7</p>
11	Oct 26, 31	<p>Discuss Chapter 10</p> <p>Finish Problems Set 7</p> <p>Submit Problems Set 6 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 11/1! Group submission. Only the indicated students will get the credit.</p> <p>Submit Weekly Quiz 7 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 11/1! Individual submission</p> <p>Download, print, read and bring Chapter 12 handout 2016 from Canvas. Modules tab..</p> <p><i>Prepare in advance for the next session:</i></p> <p>Watch video: http://www.youtube.com/watch?v=TQB1VILBgJE</p> <p>Read 12-4: Op-Amps with Negative Feedback</p> <p>Read 12-5: Effects of Negative Feedback on Op-Amp Impedance</p> <p>Read 12-7: Open-Loop Response</p> <p>Read 12-8: Closed-Loop Response</p> <p>Answer Problems Set 8</p>
12	Nov 2, 7	<p>Discuss Chapter 12</p> <p>Finish Problems Set 8</p> <p>Submit Problems Set 7 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 11/8! Group submission. Only the indicated students will get the credit.</p> <p>Submit Weekly Quiz 8 via Canvas. Click on the Assignments tab. Due by 11:00 pm on 11/8! Individual submission</p> <p>Download, print, read and bring Chapters 13 & 16 handout 2016 from Canvas. Modules</p>

Session	Date	Topics, Readings, Assignments, Deadlines
		<p>tab..</p> <p><i>Prepare in advance for the next session:</i></p> <p>Watch video: http://www.youtube.com/watch?v=nG8gA_kAp-Y</p> <p>Read 13-1: Comparators</p> <p>Read 13-2: Summing Amplifiers</p> <p>Read 13-3: Integrators and Differentiators</p> <p>Read 16-2: Feedback Oscillator Principles and Oscillator types</p> <p>Answer Problems Set 9</p>
13	Nov 9, 14, 16, 21	<p>Discuss Chapters 13 & 16</p> <p>Finish Problems Set 9</p> <p>Submit Problems Set 8 via Canvas. Click on the Assignments tab. <i>Due by 11:00 pm on 11/22! Group submission. Only the indicated students will get the credit.</i></p> <p>Submit Weekly Quiz 9 via Canvas. Click on the Assignments tab. <i>Due by 11:00 pm on 11/22! Individual submission</i></p> <p><i>Prepare in advance for the next session:</i></p> <p>Download, print, read and bring Chapters 1 & 2 handout 2016 from Canvas. Modules tab.</p> <p>Read Ch1: Introduction to Electronics/ Ch 2: Diodes</p> <p>Watch video: http://www.youtube.com/watch?v=1A6V205VMY</p> <p>Read 1-4: The PN junction</p> <p>Read 2-1: Diode Operation</p> <p>Read 2-3: Diode Models</p> <p>Watch video: http://www.youtube.com/watch?v=yj4uVVV5Nsg</p> <p>Read 2-4: Half-Wave Rectifiers</p> <p>Read 2-5: Full-Wave Rectifiers</p> <p>Answer Problems Set 10</p>
14	Nov 23, 28	<p>Discuss Chapters 1 & 2</p> <p>Finish Problems Set 10</p> <p>Submit Problems Set 9 via Canvas. Click on the Assignments tab. <i>Due by 11:00 pm on 11/29! Group submission. Only the indicated students will get the credit.</i></p> <p>Submit Weekly Quiz 10 via Canvas. Click on the Assignments tab. <i>Due by 11:00 pm on 11/29! Individual submission</i></p> <p>Prepare for Midterm 2</p>
15	Nov 30	Catch Up
16	Dec 5	<p>Midterm 2</p> <p><i>Prepare in advance for the next session:</i></p> <p>Download, print, read and bring Chapter 3 handout 2016 from Canvas. Modules tab</p> <p>Read 2-6: Power Supply Filters and Regulators</p> <p>Read Ch3: Special-Purpose Diodes</p> <p>Watch video: http://www.youtube.com/watch?v=jG2YAtTWxvc</p>

Session	Date	Topics, Readings, Assignments, Deadlines
		Read 3-1: The Zener Diode Read 3-2: Zener Diode Application Answer Problems Set 11
17	Dec 7, 12	Discuss Chapter 3 Finish Problems Set 11 Submit Problems Set 10 via Canvas . Click on the Assignments tab. <i>Due by 11:00 pm on 12/13! Group submission. Only the indicated students will get the credit.</i> Submit Problems Set 11 via Canvas . Click on the Assignments tab. <i>Due by 11:00 pm on 12/13! Group submission. Only the indicated students will get the credit.</i> (Optional) Submit Tech 62 - 40% Final Exam problems via Canvas . Click on the Assignments tab. <i>Due by 11:00 pm on 12/13! Group submission. Only the indicated students will get the credit.</i>
Final Exam	Dec 15	Thursday, 1215 - 1430

** Subject to change with fair notice via email through my.sjsu.