San José State University  
Electrical Engineering Department  
EE-124, Electronic Circuit II

Course and Contact Information

Instructor: Dr. Shahab Ardalan
Office Location: ENG 345
Telephone: 408-924-4075
Email: shahab.ardalan@sjsu.edu
Office Hours: http://ardalan.youcanbook.me/
Class Days/Time: MW 9:00-10:45
Classroom: ENG-345
Course Website: http://www.engr.sjsu.edu/ardalan
Prerequisite: EE122, EE128 and Engr100W with grades of C or better

Course Description

Analysis and design of Analog integrated circuits using Bipolar and CMOS transistors. Topics include current sources, active loads, differential amplifiers, frequency response, frequency compensation, output stages, feedback amplifiers and operational amplifiers.

Course Goal and Student Learning Objective

This course teaches design of fundamental building blocks for Analog integrated circuits. It begins with analysis and design of current sources and active loads using Bipolar and CMOS transistors. Design of single-stage and differential-pair amplifiers with their frequency response is introduced. Impact of feedback on input and output resistances as well as voltage and current gains is analyzed. Design of output stages and operational amplifiers are discussed. Frequency compensation and power-bandwidth optimization in amplifiers are also studied.

GE/SJSU Studies Learning Outcomes (LO)

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

GELO 1. Demonstrate an understanding of the fundamentals of Electrical Engineering, including its mathematical and scientific principles, analysis and design.

GELO 2. Demonstrate the ability to apply the practice of Engineering in real-world problems.
ABET Outcomes

The letters in parentheses in the course learning objectives refer to ABET criterion 3 outcomes satisfied by the course. These are listed below as a reference:

a) An ability to apply knowledge of mathematics, science, and engineering
b) An ability to design and conduct experiments, as well as to analyze and interpret data
c) An ability to design a system, component, or process to meet desired needs
d) An ability to function on multi-disciplinary teams
e) An ability to identify, formulate, and solve engineering problems
f) An understanding of professional and ethical responsibility
g) An ability to communicate effectively
h) The broad education necessary to understand the impact of engineering solutions in a global and societal context
i) A recognition of the need for, and an ability to engage in life-long learning
j) A knowledge of contemporary issues
k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
l) Specialization in one or more technical specialties that meet the needs of companies
m) Knowledge of probability and statistics, including applications to electrical engineering
n) Knowledge of advanced mathematics, including differential and integral equations, linear algebra, complex variables, and discrete mathematics
o) 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

Course Learning Outcomes

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

CLO 1. Apply the knowledge of mathematics, science, and engineering in circuit analysis (3.a)
CLO 2. Analyze and design integrated amplifier circuits to meet desired needs (3.c)
CLO 3. Identify, formulate, and solve engineering problems in Analog circuit design (3.e)
CLO 4. Demonstrate to use the techniques, skills, and modern engineering tools necessary for engineering practice (3.k)
Required Texts/Readings

Textbook

www.wiley.com/college/razavi

Other Readings

www.sedrasmith.org

Course Requirements and Assignments

Class participation, Quiz, assignments, midterm exams, lab and final exam

Grading Policy

Exams will be closed book. However, students are allowed to bring 1/2 page of aid sheet, where can be option from this link (www.ardalan.ws/pdf). There will be no make-up exam and those absent will receive no credit. Students must write their answers clearly in an organized fashion. Further instructions will be provided during exams. The course is based on letter grading and grading percentage breakdown is as follow:

90% and above  A
89% - 85%  A-
84% - 82%  B+
81% - 79%  B
78% - 75%  B-
74% - 72%  C+
71% - 69%  C
68% - 65%  C-
64% - 62%  D+
61% - 59%  D
58% - 55%  D
below 55%  F

Total final grade is

Quizz  5%
Assignment  5%
Midterm Exam-1  15%
Midterm Exam-2  15%
Final Exam  35%
Laboratory  25%

Classroom Protocol

Students are required to be in class on time and no use of cell phone during the class.
University Policies

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

- “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor’s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.” To obtain the permission for recording the lectures you need to request it in formal writing for each lecture.
- “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf 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 Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make 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 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

Accommodation to Students’ Religious Holidays

San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to
make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See University Policy S14-7 at http://www.sjsu.edu/senate/docs/S14-7.pdf.
### EE124-Electronic Design II, Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 30, 2017</td>
<td>Review of MOSFETs</td>
</tr>
<tr>
<td>February 1, 2017</td>
<td>Integrated Circuit Design</td>
</tr>
<tr>
<td>February 6, 2017</td>
<td>CS Amplifiers</td>
</tr>
<tr>
<td>February 8, 2017</td>
<td>CS Amplifiers</td>
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<tr>
<td>February 13, 2017</td>
<td>CG Amplifiers</td>
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<tr>
<td>February 15, 2017</td>
<td>CG Amplifiers</td>
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<tr>
<td>February 20, 2017</td>
<td>CD Amplifier</td>
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<tr>
<td>February 22, 2017</td>
<td>CD Amplifier</td>
</tr>
<tr>
<td>February 27, 2017</td>
<td>Cascode Amplifiers I</td>
</tr>
<tr>
<td>March 1, 2017</td>
<td>Midterm Exam 1</td>
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<tr>
<td>March 6, 2017</td>
<td>Solutions to Midterm Exam 1</td>
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<tr>
<td>March 8, 2017</td>
<td>Current Mirrors</td>
</tr>
<tr>
<td>March 13, 2017</td>
<td>Cascode Amplifiers I</td>
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<tr>
<td>March 15, 2017</td>
<td>Cascode Amplifiers I</td>
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<tr>
<td>March 20, 2017</td>
<td>Differential-Pair Amplifiers</td>
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<tr>
<td>March 22, 2017</td>
<td>Small-Signal Analysis of Differential-Pair Amplifiers</td>
</tr>
<tr>
<td>March 27, 2017</td>
<td>Spring Recess</td>
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<tr>
<td>March 29, 2017</td>
<td>Spring Recess</td>
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<tr>
<td>April 3, 2017</td>
<td>Differential to Single-Ended Conversion</td>
</tr>
<tr>
<td>April 5, 2017</td>
<td>High Frequency Modeling</td>
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<tr>
<td>April 10, 2017</td>
<td>High Frequency Modeling</td>
</tr>
<tr>
<td>April 12, 2017</td>
<td>Review</td>
</tr>
<tr>
<td>April 17, 2017</td>
<td>Midterm Exam 2</td>
</tr>
<tr>
<td>April 19, 2017</td>
<td>Solutions to Midterm Exam 2</td>
</tr>
<tr>
<td>April 24, 2017</td>
<td>Frequency Response of CS Amplifiers</td>
</tr>
<tr>
<td>April 26, 2017</td>
<td>Frequency Response of CG Amplifiers</td>
</tr>
<tr>
<td>May 1, 2017</td>
<td>Frequency Response of CD Amplifiers</td>
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<tr>
<td>May 3, 2017</td>
<td>Feedback</td>
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<tr>
<td>May 8, 2017</td>
<td>Voltage-Voltage Feedback</td>
</tr>
<tr>
<td>May 10, 2017</td>
<td>Voltage-Voltage Feedback</td>
</tr>
<tr>
<td>May 15, 2017</td>
<td>Review</td>
</tr>
<tr>
<td>May 22, 2017</td>
<td>Comprehensive Final Exam</td>
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