

**SAN JOST STATE UNIVERSITY
DEPARTMENT OF ELECTRICAL ENGINEERING**

EE124L

Electronic Design Laboratory II Syllabus

SPRING 2006

Course Objectives

1. To strengthen students' ability of using basic electronic test equipment including a digital sampling oscilloscope.
2. To enhance students' ability to properly document laboratory work and to explain their conclusion with reference to collected data.
3. To provide students the experience with the practical issues involved in designing, building, testing, and troubleshooting electronic circuits.
4. To enhance students' understanding of the lecture part of the course.

Topics

<i>Experiment 0</i>	<i>Familiarization with PSPICE</i>
<i>Experiment 1</i>	<i>Introduction to the Digital Oscilloscope</i>
<i>Experiment 2</i>	<i>A Simple Current Mirror</i>
<i>Experiment 3</i>	<i>Elements of Differential Amplifiers</i>
<i>Experiment 4</i>	<i>Operational Transconductance Amplifier (LM13700)</i>
<i>Experiment 5</i>	<i>A Feedback Amplifier Design Exercise</i>
<i>Experiment 6</i>	<i>The Effects of Frequency Compensation</i>
<i>Experiment 7</i>	<i>An Individually Selected Lab</i>

Prerequisite(s)

EE124 Electronic Design II lecture must be taken concurrently. Must have taken Engr 100W, EE122 and EE128, all with a grade of C or better.

Outcomes

Students should successfully perform the following tasks in regard to analog circuit design, measurement and reporting of results:

- Research on the design problem
- Verification on specifications
- Paper and pencil design
- SPICE simulation
- Preliminary report
- Build circuits properly (under consideration of frequency, power supply decoupling, and op amp compensation)
- Proper use of measurement equipment
- Trouble shooting techniques
- Lab notebook entries

- Post measurement analysis
- Report writing (informal and formal)
- Oral reporting
- Teamwork

Outcome Assessment

- Class participation
- Design Experiments
- PSPICE Simulation
- Preliminary Reports
- Lab Notebook
- Informal and Formal Final Reports
- Project
- Presentation
- Quizzes
- Semester-end course and instructor evaluation.

Relationship to Program Objectives and ABET Program Criteria

Program objectives	Learning Obj.	Level of support
(a) an ability to apply knowledge of mathematics, science, and engineering	1-5	Advanced
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	Lab	Advanced
(c) an ability to design a system, component, or process to meet desired needs	1-5	Advanced
(d) an ability to function on multi-disciplinary teams		Not supported
(e) an ability to identify, formulate, and solve engineering problems	1-5	Advanced
(f) an understanding of professional and ethical responsibility		Not supported
(g) an ability to communicate effectively	5, Lab	Advanced
(h) broad education to understand impact of eng solutions in global & societal context		Not supported
(i) a recognition of the need for, and an ability to engage in life-long learning	5	Moderate
(j) a knowledge of contemporary issues	5	Moderate
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	1-5, Lab	Advanced
(l) one or more technical specialties that meet the needs of Silicon Valley companies	5	Moderate

Program Criteria	Learning Obj.	Level of support
Knowledge of probability and statistics	Lab	Moderate
Knowledge of mathematics through differential and integral calculus, basic sciences, and engineering sciences necessary to analyze and design complex devices	1-5, Lab	Moderate
Systems containing hardware and software components	5, Lab	Advanced

Relationship of Course to Program Objectives

See above

s.

Final Reports: Each **lab station group** of students will hand in a final report for each experiment. There are two types of final reports: the Experiment Review Report and the Formal Report. The **Final Review Report** of five experiments (Lab 1, 2, 3, 4, 6) should have an abstract followed by the analysis and conclusions section. Answers to the conclusion questions in the lab manual must be complete, including appropriate heading at each question, presentation of circuit(s), relevant graphs, equations etc. The report must be written such, that, if it is used in a design review meeting, all matter pertaining to the question is documented and no other references like lab manual or lab notebook are necessary to understand the subject discussed. Two experiments (Lab 5 & 7) will require a **Final Formal Report** where report writing skills learnt from 100W must be demonstrated.

Pre-labs: Most experiments will have a pre-lab assignment due on the first day of that experiment. The purpose for this assignment is to ensure that the student is well-prepared for the experiment. Pre-labs will not be collected. In some instances the pre-lab info should be entered into the lab notebook. Quizzes will be given in the beginning of the lab, where the questions will cover both, understanding of the pre-lab as well as of previous experiments.

Lab Performance: This area is generally defined as a measure of the students' effort in doing the laboratory work. Good performance is indicated by being on time, making good use of lab time, being an active participant in the lab group's effort, etc. At the end of the semester the lab performance counts as a "quiz grade". Also the presentation evaluation counts as another "quiz grade".

Exams

Two scheduled interim exams will be given. These exams will cover laboratory-oriented topics. It is understood that the student understands the lecture material pertaining to the lab experiments. Also prelab quizzes will be given at those lab periods where a pre-lab preparation is required. Quizzes may also be given at other times.

There will be no make-up exams/quizzes. Any student who fails to take an examination will receive a letter grade of F for that particular examination.

Grading

The EE124L laboratory grade will count for 25% of the student's overall EE124 course grade. The laboratory grade will be determined by the following criteria:

Lab Notebook Grades	15%	Interim Exams #1	25%
Final Reports	15%	Interim Exams #2	25%
Prelab Quizzes	20%		

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Honesty and Respect for Others and Public Property

EE HONOR CODE

The Electrical Engineering Department will enforce the following Honor Code that must be read and accepted by all students.

“I have read the Honor Code and agree with its provisions. My continued enrollment in this course constitutes full acceptance of this code. I will NOT:

- Take an exam in place of someone else, or have someone take an exam in my place*
- Give information or receive information from another person during an exam*
- Use more reference material during an exam than is allowed by the instructor*
- Obtain a copy of an exam prior to the time it is given*
- Alter an exam after it has been graded and then return it to the instructor for re-grading*
- Leave the exam room without returning the exam to the instructor.*
- “Recycle” old lab reports, by using old reports and changing the name(s), title page information and altering the data so it looks like a new report.*

Measures Dealing with Occurrences of Cheating

- Department policy mandates that the student or students involved in cheating will receive an “F” on that evaluation instrument (paper, exam, project, homework, etc.) and will be reported to the Department and the University.*
- A student’s second offense in any course will result in a Department recommendation of suspension from the University.*

Course Schedule

<u>Lab Week</u>				<u>Scheduled Work</u>		<u>Assignments Due</u>
<u>M</u>	<u>T</u>	<u>W</u>	<u>Th</u>	<u>Experiment</u>	<u>Subject</u>	
		1/25	1/26		Introduction; Roster Check	none
1/30	1/31	2/1	2/2	Experiment 0	Introduction and PSPICE	none
2/6	2/7	2/8	2/9	Experiment 1	Intro to Digital Oscilloscope	Prelab 1 Quiz Bring labbook, tools, protoboard
2/13	2/14	2/15	2/16	Experiment 2A	A Simple Current Mirror	Prelab 2 Quiz
2/20	2/21	2/22	2/23	Experiment 2B	A Simple Current Mirror	Final Review Report 1
2/27	2/28	3/1	3/2	Experiment 3A	Elements of Diff. Amps.	Prelab 3 Quiz
3/6	3/7	3/8	3/9	Experiment 3B	Elements of Diff. Amps.	Final Review Report 2
3/13	3/14	3/15	3/16	Experiment 4	Op. Transcond. Amps.	Interim Exam #1
3/20	3/21	3/22	3/23	Experiment 5A	Feedback Amplifier	Prelab 5 Quiz; Final Review Report 3
3/27	3/28	3/29	3/30			Spring Break
4/3	4/4	4/5	4/6	Experiment 5B	Feedback Amplifier	Final Review Report 4
4/10	4/11	4/12	4/13	Experiment 6A	Frequ Comp & Slew Rate	Prelab 6 Quiz
4/17	4/18	4/19	4/20	Experiment 6B	Frequ Comp & Slew Rate	Final Formal Report 5
4/24	4/25	4/26	4/27	Experiment 7A	Individual Lab Project	Prelab 7 Quiz
5/1	5/2	5/3	5/4	Experiment 7B	Individual Lab Project	Final Review Report 6
5/8	5/9	5/10	5/11	Experiment 7C	Presentations	Final Formal Report; Interim Exam

Note 1: Some instructors may give additional quizzes to those indicated on this schedule. Some times the Prelab Quiz (Part A & Part B) might be given in two successive lab-sessions.

Note 2 Be careful to look at the date of your lab corresponding to the Experiment # and day of week

Note 3: Other important dates:

Wednesday, Sept. 5	First day of instruction
Monday, Feb. 6	Last day to drop or withdraw without a "W" grade
Monday, Feb. 13	Last day to add courses
Tuesday, Feb. 21	Enrollment census date
Monday – Friday, Mar. 27-31	Spring Break (No classes)
Tuesday, May 16	Last day of instructions
Wednesday, May 17	No classes, no exams
Thursday – Wednesday, May 18-24	Finals

EE 124 Lab Schedule

Time of day	Monday	Tuesday	Wednesday	Thursday
08:30 - 11:20		S05 Strasilla		S07 Strasilla
14:30 - 17:20		S06 Strasilla		S08 Strasilla
19:00 - 21:50	S04 Kim		S10 Nguyen	

Course Instructors

Instructors	Hanh Nguyen	Joseph Kim	Udo Strasilla
Office	Room E258	Room E258	E259
Office Hours	T 12:00 – 13:00	M 18:30 – 19:00 M 21:50 – 22:20	M 19:00-19:50 TTh 11:30-13:00 M
Telephone		(650) 344-4505	(408) 924-3920
E-mail	hanhnguyenth@yahoo.com	josephkim@yahoo.com	ustrasil@email.sjsu.edu
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Website			http://www.engr.sjsu.edu/ustrasil

To obtain updated info please see the EE124 website:

<http://www.engr.sjsu.edu/ee124>

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