California State University, Northridge - Spring 2013
Department of Electrical & Computer Engineering

ECE 240L – Electrical Engineering Fundamentals Lab
Credit Units: 1.00

Professor: Franco Mikhailidis
EMAIL: franco.mikhailidis.78@csun.edu

Class Schedule: Mondays 2:00PM – 4:45PM, JD1562
Office Hours: Mondays 12:30PM – 1:30PM, JD3341

If you have a disability and need accommodations, please register with the Disability Resources and Educational Services (DRES) office or the National Center on Deafness (NCOD). The DRES office is located in Bayramian Hall, room 110 and can be reached at (818) 677-2684. NCOD is located on Bertrand Street in Jeanne Chisholm Hall and can be reached at (818) 677-2054. If you would like to discuss your need for accommodations with me, please contact me to set up an appointment.

I – SOFTWARE USED

1. Pspice computer simulation software.
   (available on engineering lab computers or free download from):

   http://www.cadence.com/products/orcad/pages/downloads.aspx

   NOTE: Use of other similar programs is not allowed.

2. Word Processor and Spread Sheet software, such as MS Word and MS Excel.
   (available on engineering lab computers).

II – LAB ACCESSORIES & OTHER ITEMS REQUIRED

1. Scope probes, leads, etc. See Appendix I for a complete list (these items may be purchased in a kit from the bookstore).
2. Lab Instructions Manual (may be purchased from the bookstore).
3. Lab Notebook (may be purchased from the bookstore).

III - PREREQUISITE

PHYS 220/L; MATH 250 or equivalent, with a grade of C- or better.

IV - COREQUISITE

ECE 240 (Electrical Engineering Fundamentals).

V - GRADING POLICY

Attendance & Participation	30%	+ / - Grading is used in this course
Lab Report	30%	
Lab Notebook	30%	
Quizzes	10%	

VI – CLASS POLICIES AND PROCEDURES

Attendance:

Each student is required to attend every lab session. Students are responsible for arriving before class begins and staying in the classroom for the duration of the class, unless they have completed all the requirements assigned by the instructor. If a student misses a lab session, he or she should have a very good reason for doing so. If a student is not able to attend any of the lab sessions, he or she must notify the instructor ahead of the time, before the scheduled meeting.

Participation:

All group members must stay busy at all times, participate equally, and rotate their responsibilities. They must show initiative in performing the hand calculations, performing the computer simulations, constructing the required circuits using real components, setting up the test equipment, and troubleshooting the test set up. In addition, all students in a group must work together as a team and no one person should dominate or rush because he or she wants to leave early.

Tardiness:

Each student is required to arrive in the classroom before the scheduled time. There will be a brief review of the experiment(s) and a Q/A session in the beginning of each lab session. If a student arrives late, 30% will be deducted from his or her final score for that lab session.

Lab Reports:

Students will work in groups and each group will submit only one report for each lab session. Lab reports must be prepared in accordance with the documentation format (see Appendix II) and the requirements (see Appendix III) provided by the instructor. No exceptions. The responsibility for preparing, writing, and submitting the reports, will be alternated each week. Only the student who has submitted the report will receive full credit. If students do not alternate their responsibilities when they are supposed to do so, 50% will be deducted from their lab score. Each report must be submitted via moodle.csun.edu one week or earlier after each lab session. Students who are not present in the lab will not get credit for the experiment(s) and their names must not appear on the report. No late lab report is accepted. No exceptions.

Lab Notebooks:

In addition to the lab report prepared by each group, each student will maintain a lab notebook showing his or her own work during the semester. Lab notebooks must be of quad ruled composition type and hardbound. Every page must be numbered (i.e. 1, 2, , . . 100, . . . 200, . .). In addition, First Name, Last Name, Date, and Title of each experiment must be written on the first page for each experiment. Students must have their lab notebooks available for the instructor during each session to be examined and signed by the instructor. No exceptions. If a student forgets to present his or her lab notebook, 50% or more will be deducted from his or her final score for that lab session.

Lab Experiments:

Lab experiments will be assigned on a regular basis each week. Each experiment or circuit must be shown to the lab instructor and the results must be verified by the instructor, before continuing with the next experiment or circuit. Each lab experiment must be documented and must include hand calculations, Pspice computer simulations, and a circuit constructed and tested on the proto-board. No exceptions.

Quizzes & Other Tests:

There will be unannounced written quizzes to assess each student's design skills and theoretical knowledge. In addition, students should be prepared to answer some fundamental questions in regards to the experiments they are working on and the equipment they use. Familiarity with the Test Equipment and Pspice is a must.

Homework & Preparation:

Each student must complete the preliminary calculations noted in the Instruction Manual. The preliminary calculations must be done in the lab notebooks and will be reviewed in the beginning of each lab session. If the preliminary calculations are missing from the lab notebooks, 50% will be deducted from the final score for that lab session.

Course Outcome:

By the end of the semester, each student must be familiar with Oscilloscopes and all other equipment in the lab. In addition, each student must demonstrate his or her ability to model and simulate electrical circuits using Pspice, construct and test circuits using real components, and be able to troubleshoot test set ups (see Appendix IV for proper lab practices & policies).

Academic Integrity:

Ideas and learning form the core of the academic community. In all centers of education, learning is valued and honored. No learning institution can thrive if its members counterfeit their achievement and seek to establish an unfair advantage over their fellow students. The Academic Integrity is designed to foster a fair and impartial set of standards. All students are required to adhere to these standards. Any dishonest act such as copying, plagiarism, lying, unauthorized collaboration, alteration of records, bribery, and misrepresentation for the purpose of enhancing one's academic standing results in a failing grade for the entire course and will be reported to the College as well as Dean of Student.

COURSE SCHEDULE

Week 1	Introduction	Review of Course Syllabus & Equipment Grounding
Week 2	Experiment 1	Laboratory Instruments & Reports
Week 3	Experiment 2	Oscilloscopes
Week 4	Experiment 3	DC Circuits
Week 5	Experiment 4	Computer Simulation (PSpice)
Week 6	Experiment 5	Network Theorems
Weeks 7 & 8	Experiment 6	Operational Amplifiers
Week 9	Experiment 7	First Order Circuits
Week 10	Experiment 8	Second Order Circuits
Week 11	Experiment 9	Impedance & Admittance Measurement
Week 12	Experiment 10	Frequency Response
Week 13	Experiment 11	Passive Filters
Week 14	Experiment 12	Circuit Design Experiment

NOTE:

This course schedule is subject to change with prior notice to students.

APPENDIX I
Lab Accessories

If you cannot find the lab kit in the bookstore or if it is too expensive for purchase, then you may buy each item separately from any store that sells these items:

1. Two scope probes (to take AC measurements)

2. One or two BNC to Alligator clips cable (to connect the function generator to the breadboard)

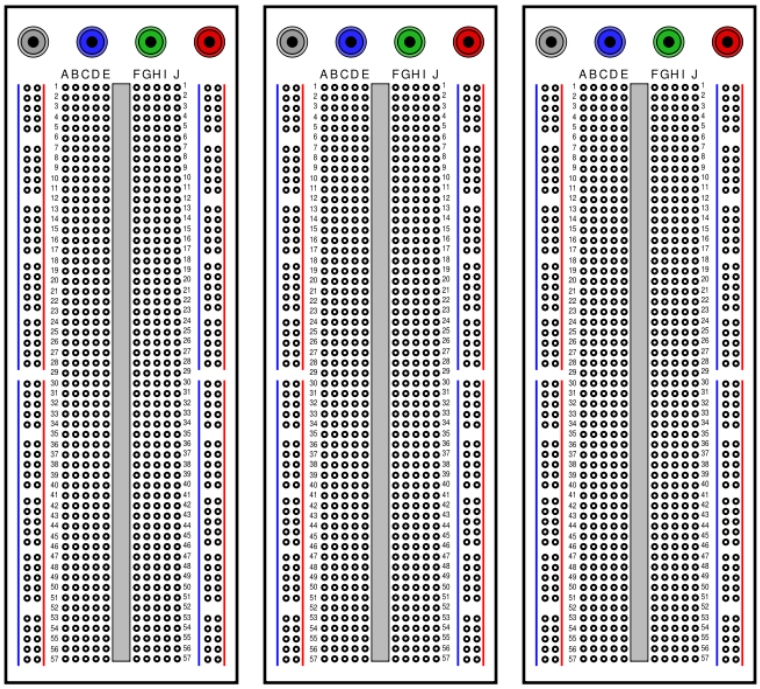
3. Six or more test leads with Banana jacks on both ends (black, red, etc.). Three feet or longer (to connect the DC power supply and the digital multimeter to the breadboard)

4. Six or more Alligator clips

5. Bread-board or Proto-board for constructing circuits

6. (Optional) – A BNC to BNC coaxial cable (to connect the function generator to the scopes directly)

NOTE: There are Proto-boards in Room JD-1562; however, some may be damaged and intermittent due to over usage.



APPENDIX II

Cover Page For Reports

Spring 2013

California State University, Northridge

Department of Electrical & Computer Engineering

Experiment 5
Building and Testing a Transfer Function

January 07, 2013

ECE 240L

Professor: Franco Mikhailidis

Name 1
Name 2

APPENDIX II (Continued)
Required Format For Preparing Reports

1. Purpose OR Introduction:

2. Equipment Used:

Type	*Model*	*Serial No.*	*Calibration Date*
Oscilloscope	HP123	123456	07-11-10
Function Generator			
DC Power Supply			
Etc.			

3. Parts Used:

QTY	*Component*	*Value*	*Type*
4	Resistor	10K	Carbon, +/-5%
1	Capacitor	10UF	Tantalum, +15V
3	Op-amp		ua741

4. Software Used:

Pspice Released Version: 16.0.0.s001
MS Office 2010

5. Theory:

Include a brief theoretical background (text, block diagram, schematic, graphs, formulas, etc.) for the reader as it relates to the experiment.

6. Procedure and Results:

Include a brief procedure with schematics and/or block diagrams for each section of the experiment(s). Follow each procedure with its respective results and discussion of results. Do not accumulate all the steps together and then show the results at the end.

7. Conclusion:

Write a summary of your findings and what you have learned based on your own experience performing the experiment(s). Make some references to previous sections to validate your findings. Also, include at least one table (matrix) listing the key parameters and the %error between theoretical and measured values.

APPENDIX III
Requirements For Preparing The Reports

a) A lab report is not an Instruction Manual. Therefore, all lab reports must be written in past tense & passive sentences (3rd Person) only. The experiment was performed in the past. It is history.

b) There must be no references to any part of the Instruction Manual in a report. The report is a stand-alone document and must include all the information needed to perform the experiment(s).

c) Words and phrases such as, we, the professor, our group, our last experiment, etc. should not be used in a report. They are irrelevant and have nothing to do with the experiment(s) performed.

d) Students must not copy from each other or the Instruction Manual. This may be viewed as plagiarism.

e) All reports must contain schematics and/or block diagrams, equations, graphs, tables, charts, etc.

f) All Equations, Diagrams, Tables, Graphs, Charts, etc. must be labeled with proper sequence of numbers and titles.

g) Students must use proper grammar when writing their reports.

h) All reports must be double checked for obvious errors, such as incorrect spelling, use of incorrect references, etc.

APPENDIX III (*Continued)*

Procedure Section: This section must show the schematic diagram of the circuit that was constructed. It may also include additional information to help construct and test this circuit. For example:

The circuit shown in figure 1 was constructed and . . . . . .

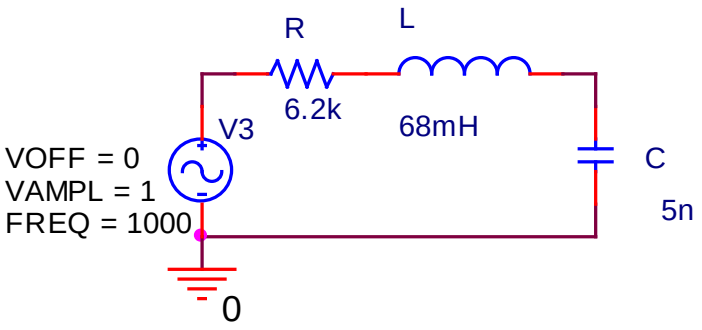


Figure 1: Schematic diagram for . . . . . .

Results Section: This section should include some hand calculations, Pspice simulation results, Scope traces, and relevant measurements of key parameters (use tables when applicable to save space and make it easy to read/follow). For example:

Figure 2 shows the Pspice simulation results for . . . . . .

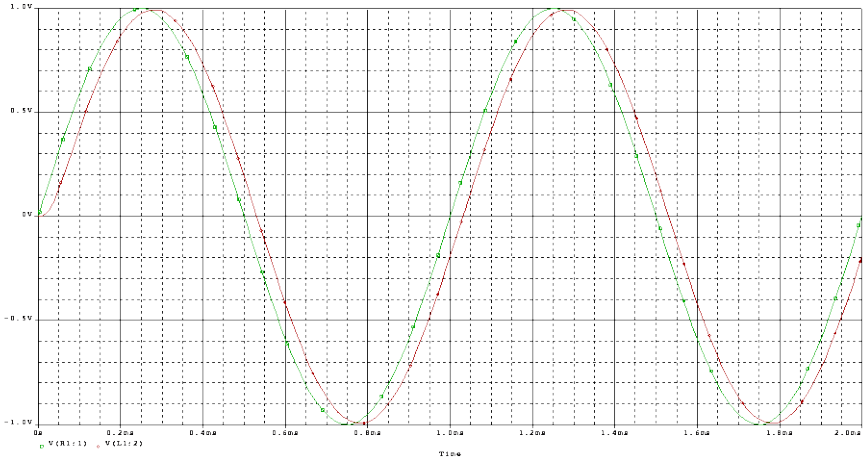


Figure 2: Pspice simulation showing . . . . . .

APPENDIX III (*Continued)*

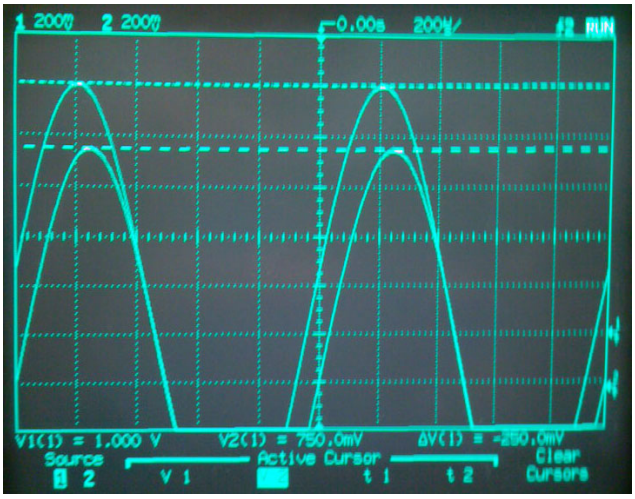


Figure 3: Scope trace showing . . . . . .

$$\Delta t = 40\mu s$$

$$\varphi = 360^\circ \cdot f \cdot \Delta t$$

$$\varphi = 14.4^\circ$$

Discussion Section: In this section you will discuss what you have learned after studying the results. For example:

Increasing the input frequency has caused . . . . . .
Refering to Table 3, theoretical and measured values for . . . . . match very closely. the error is only 1%.

NOTE: Do not accumulate procedures and then the results. Each result and discussion must be followed right after its corresponding procedure.

Conclusion Section: In this section you will provide a summary of your findings after you have completed all the experiment(s). You must make references to some of the results mentioned in previous sections (using Figure, Equation, and Table numbers) to validate your point(s). When applicable, include a Table (Matrix) of some of the key parameters with their associated values and %error between calculated values and actual measured values.

APPENDIX IV
Laboratory Practices & Policies

PRACTICES:

You must use the proper scope probes and accessories as required by the instructor.

When taking measurements using Oscilloscopes:

a) You must pay attention to X1 vs X10 settings on the scope probes as well as the Oscilloscopes, themselves. By default, digital Oscilloscopes are set to X10.

b) You must pay attention to Ground references and scaling (volts/div & sec/div).

c) You must pay attention to AC vs DC coupling.

d) You must pay attention to the Peak, RMS, and Peak-to-Peak values. You must stay consistent and do not mix these values.

e) You must pay attention and know the difference between the input voltage and the source voltage.

f) Input (reference) source voltage must be displayed on the Oscilloscope screen at all times. Use channel 1 or A for input (reference) voltage.

g) You must always use a stable known signal for triggering the Oscilloscopes. Typically the input (reference) source voltage is a good start.

POLICIES:

1. At the end of the Lab period, please do the following:
    a. Clean up your work bench and pick up your trash
    b. Put your chairs back in place
    c. Turn off all equipment and return them back in place

2. No food or drink is allowed.

3. Faculty should be the last to leave the room and no students may be left behind.