EEE117L Network Analysis Lab - SECTION 01

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EEE 117L Network Analysis Laboratory Syllabus

California State University Sacramento

Department of Electrical and Electronic Engineering

Spring 2022 Semester

Lab Meeting Time and Place:

Section 02: Mondays from 1:30 pm – 4:10 pm in Riverside Hall 3017

Section 05: Tuesdays from 1:30 pm – 4:10 pm in Riverside Hall 3017

Section 01: Wednesdays from 1:30 – 4:10 pm in Riverside Hall 3017

Instructor Information:

Instructor: Sergio Aguilar Rudametkin

You may call me "Professor Aguilar" or simply "Professor"

Office Hours: To be announced

Office: Riverside Hall 3018 (tentative)

Zoom Personal Meeting ID: 886-909-2101

Zoom Personal Meeting URL: https://csus.zoom.us/j/8869092101

The best way to contact me is to use the messaging system inside of Canvas.

Emails: **siarudametkin@hotmail.com (mailto:siarudametkin@hotmail.com) (use this one)**

sergioaguilarru@csus.edu (mailto:sergioaguilarru@csus.edu) (don't use this one)

sergio.aguilar.rudametkin@gmail.com (mailto:sergio.aguilar.rudametkin@gmail.com) (don't use this one)

Please include EEE117L and the day of your lab in the subject line of all emails

Course Catalogue Description: Introduces fundamental laboratory techniques while demonstrating the concepts introduced in EEE 117 lecture. The computer simulation language PSPICE is introduced and applied. Laboratory three hours.

Corequisite: EEE 117. It is assumed that you have taken ENGR 17, which covers basic circuit analysis, or its equivalent at another university.

Lab Manuals: All of the lab worksheets and prelabs will be provided by the instructor and will be posted on Canvas. Keep in mind that reading the lab worksheets are unlike reading the textbook, in the sense that the lab manual is very dense reading. Every section, paragraph, sentence, and even word matters when reading the lab worksheets. Do not skip anything, as you probably will miss something important. Often times, you will need to read the lab worksheet multiple times in order to correctly understand the experiments that are to be done and to extract all relevant information.

Reference Text: 'Electric Circuits' by J.W. Nilsson & S.A. Riedel, 10th Edition, 2015 or most current version of the text.

PIVOT Kits: Due to generous donations and funders, this semester the ECS dean's office was able to procure kits that contain most (but not all) of the materials that will be needed for you to complete all of the labs successfully. These kits contain a device called the Analog Discovery 2 (AD2), a breadboard, as well as most of the circuit components such as resistors, capacitors, operational

amplifiers, etc. that will be used and reused as you assemble the circuits throughout the course of the semester. Most of you, but not all, will have received these kits in the mail before the second week of instruction. Keep in mind that these kits must be returned to the EEE department, especially the AD2 along with the components required to keep it functional. If you do not return the AD2 in working condition at the proper time then you will not receive a grade for the class and will have to retake the class and may face academic sanctions.

For those of you that did not receive the PIVOT kits, there is nothing I can do to get you one. I can't stress this enough. Even as in instructor, I had no control over who received a kit and who didn't. Unfortunately the funding has been depleted and even the company that manufactures and sells the AD2's is (at the moment) selling the AD2's on their website. If you did not receive or previously have an AD2 device then you will be required to group up with a set of students that have access to one. An alternative to having a student partner is to have myself, as an instructor, as a partner. For every lab meeting, I will be assembling the relevant circuits during the scheduled time and taking data. You will be able to use this data to complete the labs, if necessary.

Required Purchases: A breadboard must be purchased and brought to every lab. Every student must have their own breadboard. The size and style is up to the student, but every student must have their own. These can be purchased, for example, through Amazon. There may be some electrical components that students may be required to purchase for special projects at the end of the semester.

Materials that do not need to be purchased: All other electronic components, such as resistors, wires, capacitors, operational amplifiers, etc. will be provided. However, these may be purchased by the students, as well.

Recommended purchases: These are not required, but may be useful both in and outside of lab.

- A good set of wire cutters along with wire that will fit into your breadboard – there will be some labs in which you will need wire segments in order to construct your circuits. Getting some good ones will make cutting and stripping wires a lot easier.
- A set of resistors/capacitors with long leads – this is also not needed in this lab, as these components will be provided. However, if you plan on working from home to put together the

circuits before lab, then making sure that your components have long leads will be important. Beware of buying components whose leads are too short.

- Test probes for your digital multimeter that have mini hook adapters - this will help tremendously and will allow you to more easily make measurements in your circuit.
- Digital Multimeter (DMM): Even though there is a DMM available in the lab room, it is a large and often unwieldy device. For convenience, purchasing a smaller and more portable DMM will be worth it for some students. The prices of DMM's vary quite significantly, but I recommend you find one that can "autorange" and can measure AC and CD currents and voltages, and capacitance. It will be up to you to find a DMM that fits both within your price range and has the basic capabilities needed to do the labs. I highly recommend you purchase on with a CAT II or CAT III safety rating. For more on safety ratings and what they mean, refer to the following **https://en.wikipedia.org/wiki/Multimeter#Safety (https://en.wikipedia.org/wiki/Multimeter#Safety)** .

PSpice Tutorial: As you progress through your EEE education, you will find that simulations will become increasingly important. Depending on the circuit to be simulated, you will find that different programs will be more or less useful. In this lab, the simulation software that will be the most versatile and useful is PSpice. You will find, unfortunately, that the learning curve to simulate a circuit using PSpice is relatively high. PSpice is extremely "picky" when it comes to the settings chosen as you attempt to simulate even simple circuits. To help you get started, the tutorial that I found here has been one of the most useful in terms of its simplicity and completeness. It will walk you through most of the simulations that will need to be done in this lab. Keep in mind that it includes more information than is needed for the labs to be done here. The link is:

https://engineering.purdue.edu/~ee255/lecturesupp_files/PSpice-Tutorial.pdf (Links to an external site.) (https://engineering.purdue.edu/~ee255/lecturesupp_files/PSpice-Tutorial.pdf)

You can also google search "**PSpice Tutorial - Purdue Engineering - Purdue University (Links to an external site.) (https://engineering.purdue.edu/~ee255/lecturesupp_files/PSpice-Tutorial.pdf)** "

Groups: Everyone must get into a group to do the labs. The minimum group size is two, while the maximum group size is three. These limits are non-negotiable. The reason being is this lab is about being able to compromise between learning individually and learning how to function in a group. With groups smaller than two, then there isn't enough equipment in the lab to go around; while with groups

bigger than three, there are typically a few people that monopolize time with the equipment, do all the calculations, and hinder what should be a learning experience for all. The people in your groups are not fixed. However, if you change groups then it should be reflected in the cover sheet of the lab worksheets and prelabs.

Pre-labs: The pre-labs are amongst the most critical parts of the laboratory. It is where you calculate the expected values for all of the electrical parameters that will be measured in the laboratory. Unless you have expected values for the parameters that are to be measured, you cannot distinguish between acceptable and unacceptable data. You cannot compare predictions with actual measured values unless you have calculated predictions.

- All pre-labs must be done as a group. Everyone's name must be included in full on the pre-lab exercises. Everyone is encouraged to work together, have discussions and even disagreements as to how to best present the pre-lab solutions to the exercises.
- You must show all work in the calculations to get full credit. This includes assumptions made, relevant circuit diagrams, well defined nodes and loops used, variable definitions (typically, voltages with polarities and currents with directions), equations used, manipulations, units (if appropriate), and final results - both symbolic and numerical. Most derived equations should be symbolic, with numerical values used at the end of the calculation. In all cases, your predictions should be clear. If you use a result from a source, then the source must be credited clearly. No credit will be given for answers with no justification. Equations with no circuit diagrams and with no variable definitions will be given no credit.
- Your calculations must also be correct. Little to no credit will be given to pre-lab calculations that are not correct.

Grading: Your overall grade for the lab comes from two sources:

- 75% of your lab grade will be based on the average of lab reports/worksheets (lowest one dropped).
- 25% of your lab grade will come from your graded pre-labs (lowest one dropped).

Grading Scale: The typical grading scale, shown below, will be used. Grades will not be curved.

$A+: 100 - 97.0\%$	$A: < 97.0 - 93.0\%$	$A-: < 93.0 - 90.0\%$
$B+: < 80.0 - 87.0\%$	$B: < 87.0 - 83.0\%$	$B-: < 83.0 - 80.0\%$
$C+: < 70.0 - 77.0\%$	$C: < 77.0 - 73.0\%$	$C-: < 73.0 - 70.0\%$
$D+: < 60.0 - 67.0\%$	$D: < 67.0 - 63.0\%$	$D-: < 63.0 - 60.0\%$
$F: < 60.0\%$		

Canvas: All announcements and assignments will be posted on Canvas. It is important that you check your Canvas account daily. Additional materials may be posted by the instructor on Canvas.

Zoom Etiquette: In the case that we move from meeting face-to-face and being to meet online, then classes will be held through Zoom.

- Mute your microphone if you are not talking.
- Use your real name. If you do not use your real name then you will be marked as absent.
- Only post chat messages relevant to the topic being discussed.
- Turn on your video so that the instructor may see you, but be aware of your surroundings.

Canvas and Zoom Tutorial: Need help with Canvas and Zoom? You can self-enroll in a course that will help you with the basics of online learning. The course is not mandatory and should take approximately an hour. Use the link to do so: **https://csus.instructure.com/enroll/YCNYDP**

Timeliness: All students are expected to be in class on time. If a student is unable to make it on time then they are expected to enter the lab room in a quiet and respectful manner, so as not to disrupt either other students or the instructor. If a student is more than 10 minutes late then that will negatively affect their grade for the lab on the day (up to 15% of the total grade may be lost). If a student is more than 15 minutes late, then the student is considered absent and will not get credit for the lab on the day. Since attendance is a required part of the course, make sure to be on time.

Announcements and Notes: You are responsible for any announcements or notes that are made in class and are written on the board. This may not be a lecture, yet it is important that you take diligent notes. Despite the fact that this is a lab, there will often times be critical information that will be written on the board in the lab room that you will need to know.

Make-up Labs: If you were not present during the lab and did not work with your teammates in order to help with calculations, simulations, and taking data then you will not be allowed to turn in the lab worksheet for credit. If you are not able to make it to a lab then there will be two opportunities in order to do a make-up lab. The dates of the make-up labs are included in the lab schedule at the end of the syllabus.

Signing Out: It is important that you leave the lab space cleaner than you found it. This includes putting electrical components back in their place and “coil management”. This means making sure that all wires at your station are not tangled up. If you do not sign out before leaving, then it’s an automatic 10% off your total lab grade. Lesson: see me before you leave the lab room.

Academic Dishonesty: Academic dishonesty, including cheating and plagiarism, will not be tolerated. See **http://catalog.csus.edu/08-10/introductorypages/academicpolicies.pdf (http://catalog.csus.edu/08-10/introductorypages/academicpolicies.pdf)** for more details. While students are encouraged to discuss class material with their peers, all assignments turned in for credit should only be discussed in a general way. Any violations such as copying the work of other students or cheating on exams will be dealt with severely, up to and including assigning a grade of F for the course.

Food: No food or drink will be allowed in the lab room, with the exception of resealable water bottles. This includes any snacks, like cookies, chips, or fruit. It is true that labs are long and that you may get hungry, but plan ahead and eat either before or after lab. Remember, there is sensitive and expensive electronic equipment in the lab room, and the no food policy reduces the risk of damaging equipment or hurting yourself or others.

Cell Phones: All cell phones must be put on silent mode and put away before the lecture begins. Text messaging during class is NOT permitted. If an emergency phone call must be made, then the student must quietly exit the classroom and conduct the conversation outside.

Sleeping: Sleeping at any point during the lab is strictly prohibited and will not be tolerated. After a first warning, any student caught sleeping during a lab will be asked to leave. That student will be marked as absent and will not receive credit for the lab worksheet for the day. They may attend a make-up lab in order to try to earn points back for the missed lab.

Special accommodations: Special accommodations will be made for students with conditions requiring them, providing that official documentation of the condition is provided to the instructor no later than the second week of class. If you have a disability and require accommodations, you need to provide disability documentation to Services for Students with Disabilities (SSWD). For more information please visit the SSWD website at: **http://www.csus.edu/sswd/ (http://www.csus.edu/sswd/)** . They are located in Lassen Hall 1008 and can be contacted by phone at (916) 278-6955 (Voice) (916) 278-7239 (TDD only) or via email at **sswd@csus.edu (mailto:sswd@csus.edu)** .

IT Help: For assistance with ECS computer systems and software, please contact the ECS Help Desk at: **http://www.ecs.csus.edu/computing/helpdesk.php (http://www.ecs.csus.edu/computing/helpdesk.php)** . This includes Moodle, Hydra, PSpice, Matlab, and all other software on ECS servers. The ECS Help Desk can also be reached in person in Riverside Hall 2011, or at (916) 278-6690 and **helpdesk@ecs.csus.edu (mailto:helpdesk@ecs.csus.edu)** .

For assistance with IRT computer systems and software, please contact the IRT Service Desk at: **http://www.csus.edu/irt/ServiceDesk/index.html (http://www.csus.edu/irt/ServiceDesk/index.html)**
This includes SacCT, Collaborate, VPN, and all other non-ECS software.
The IRT Service Desk can also be reached in person in AIRC 2005, or
at (916) 278-7337 and **http://www.csus.edu/irt/ServiceDesk/Forms/Email.html (http://www.csus.edu/irt/ServiceDesk/Forms/Email.html)**

COVID-19 Related Information: If you are sick, stay home and do not attend class. Notify your instructor. If you are experiencing any COVID- like symptoms (fever, cough, sore throat, muscle aches, loss of smell or taste, nausea, diarrhea, or headache) or have had exposure to someone who has tested positive for COVID contact **Student Health & Counseling Services (SHCS) at 916-278-6461** to receive guidance and/or medical care. You are asked to report any possible COVID related illnesses/exposures to SHCS via this link **COVID-19 Illness/Exposure Report Form (Links to an**

external site.) (https://sacstateshcs.wufoo.com/forms/covid19-illnessexposure-report/) . Expect a call from SHCS within 24 hours. If you fall ill to COVID-19 then special arrangements may be made for you to complete any missing coursework, if you can provide medical documentation to your instructor.

Crisis Assistance and Resource Education Support (CARES) Office: If you are experiencing challenges with food, housing, financial or other unique circumstances that are impacting your education, help is just a phone call or email away! The CARES office provides case management support for any enrolled student. Email the CARES office at cares@csus.edu (mailto:cares@csus.edu) to speak with a case manager about the resources available to you. Check out the CARES website (Links to an external site.) (https://bit.ly/3fhQ1kY) .

Last Day of Instruction: The last day of instruction is Friday, May 13th, 2022.

Finals: This semester, finals week begins on Monday, May 16th, 2022. Refer to My Sac State for dates, times, and locations of your final exam for your section of this class. These dates, times, and locations will also be announced in class toward the end of the semester. There will be NO final exams for this lab class.

Policy changes: I reserve the right to modify or eliminate any portion of this syllabus at any time during the semester. However, any modifications will done brought to the students attention in writing and in class, either with an updated electronic copy of the syllabus or through changes to the syllabus on Canvas.

Lab Schedule for Fall 2022: This may change based on class progress and instructor's call.

Week	Week Begins with	Lab	Topic
1	Jan 24th	Lab Introduction	Go over the syllabus

2	Jan 30th	Lab #1	PSpice Introduction
3	Feb 7th	Lab #2	Resistance, Voltage, and Current Measurements
4	Feb 14th	Lab #3	Internal Resistance
5	Feb 21st	Lab #4 (Week I)	Oscilloscope and Function Generator
6	Feb 28th	Lab #4 (Week II)	Oscilloscope and Function Generator
7	Mar 7th	Lab #5	Pspice
8	Mar 14th	Make-up Lab	Make-up Lab
9	Mar 21st	Lab #6 (Week I)	Operational Amplifiers
10	Mar 28th	Lab #6(Week II)	Operational Amplifiers
11	Apr 4th	Lab #7 (Week I)	Low Pass Filters
12	Apr 11th	Lab #7 (Week II)	Low Pass Filters
12	Apr 18th	Make-up Lab	Make-up Lab
13	Apr 25th	Spring Break	No classes held

14	May 2nd	Lab #8 (Week I)	Pulse Detector
15	May 9th	Lab #8 (Week II)	Pulse Detector
16	May 16th	Finals Week	No classes held

Course Summary:

Date	Details	Due
Tue Jan 25, 2022	EEE117L Network Analysis Lab - SECTION 05 (https://csus.instructure.com/calendar?event_id=829429&include_contexts=course_89052)	1:30pm to 4:30pm
Wed Jan 26, 2022	EEE117L Network Analysis Lab - SECTION 01 (https://csus.instructure.com/calendar?event_id=829435&include_contexts=course_89052)	1:30pm to 4:30pm
Tue Feb 1, 2022	EEE117L Network Analysis Lab - SECTION 05 (https://csus.instructure.com/calendar?event_id=829430&include_contexts=course_89052)	1:30pm to 4:30pm
Wed Feb 2, 2022	EEE117L Network Analysis Lab - SECTION 01 (https://csus.instructure.com/calendar?event_id=829436&include_contexts=course_89052)	1:30pm to 4:30pm