

What is expected of you in the labs.

Each lab session has some mandatory **preparation** that *must be done before coming to the lab*. You must document all of your work in your lab notebooks. This includes preparation as well as work you do in the labs. Include all calculations, sketches of CRO waveforms, observations, comments, etc. The tutor will ask to see your notebook from time to time, and in the lab exams. You will be marked on what you do as reported in your notebooks, in addition to some additional questions. It is OK to cross out wrong stuff, but leave it in. Here are some basic rules:

1. Perform the experiment as directed by the lab handout. You must record data as you proceed. Record your data directly into data tables in your notebook.
2. You may leave lab when **(1)** lab time is up or **(2)** you have properly completed and recorded all of your measurements, any required computer work and **(3) you have notified your instructor**.
3. You are expected to complete your lab work in your assigned lab. However, if you must complete lab work outside of your scheduled lab you must obtain permission from the instructors involved.

The EDC lab focuses on developing foundational lab practices and good lab habits as well as utilizing the lab to better understand electronics theory presented in lecture. Because of the significance of the lab experience:

You are required to attend and complete each lab.

Always brings your:

- Completed pre-lab work
- Completed lab report
- Calculator

Grading of Lab Report

Purpose 10%

This should be one or two complete sentences *in your own words* which **clearly but briefly** describe the objective(s) of the lab.

Approach/Procedures 10%

This is a summary of the procedures of each section of the lab measurements. The procedures provided in the lab instructions are *not* to be regurgitated (copied). **Clearly but briefly summarize the procedures in your own words**. Write a separate **Approach** for each section.

Data/Graphs 60%

1. Each table/graph is to have an appropriate descriptive title.
2. Always use appropriate units. Units are not to be included in the body of the table.
3. Graphs should have labels on both axes, a legend for each line on the plot, grids and scales.

Analysis & Conclusions 40%

This is a narrative of the results of the lab exercise *in your own words*. The reader should not need to know the questions presented in the lab instructions to understand this narrative discussion. Errors exceeding expected values (generally 5 to 15%) must be properly explained.

OVERALL LAB GRADE

Component Quantity % OF COURSE GRADE: 4 Lab Experiments = 10%

SAFETY RULES

Electronic Devices and Circuits (EDC) Lab experiments utilize circuit voltages of 30V or less and thus there is minimal personal risk of electrical shock, yet basic safety rules will be followed to establish good safety habits.

1. **Remove personally worn conductors** such as metallic jewelry (watches, necklaces, etc.) which could contact the circuit.
2. **Where possible (ESPECIALLY WITH HIGH VOLTAGE), use only one hand to make measurements on live circuits. Grasp test probes only by their insulated handles (not their conducting tips).** If you use two hands and each hand touches a different potential, a voltage is developed between the left hand and right hand and produces a current through your heart. A few hundred milliamperes through the heart can cause your heart to fibrillate and can be fatal. Under the worst of conditions, a voltage as low as 24 volts can be fatal.
3. **Be sure hands, body, clothing, etc. are dry.** Dampness (e.g., perspiration) reduces your body contact resistance significantly. Wet body draws significantly more current than a dry body for the same voltage.
4. **Turn off power to your circuit when making connections or changes to your circuit.**
5. If you ever encounter someone being electrocuted, do not touch the person, do not touch the circuit, and do not touch either with a metal object or else you can become part of the circuit. If possible, turn off the power. The entire lab has one large, red, knob-like switch located by the door. The red push knob switch is the 220V main circuit breaker that services all the individual lab stations. If ever needed, push in this switch to turn off all 220V power to the individual lab stations and baseboard outlets. If outside of lab environment and if turning power off is not possible, it may be possible to use a long insulated rod (long stick or long wooden handle) to push the electrical circuit away from the person or the person away from the circuit. **Whatever you do, do not put yourself in jeopardy too.** Once a person is disconnected from the electricity, immediate and proper medical attention is required. Also, for your general information, ordinary 220 V electrocutes more people than any other voltage.
6. Always consider a soldering iron to be hot unless you absolutely know otherwise. The smell of burning flesh is not pleasant, especially when it is your own. Wear goggles when soldering to protect yourself from hot, splattering solder.
7. Always cut wire and component leads away from yourself and others and not across the room. For wires and leads to fit best into the experimenter board, cut them diagonally. Always be conscious of sharp wire, component leads, equipment leads, etc.
8. Beware of frayed power leads (220V) and report any damaged or non-working equipment to lab instructor.

SAFETY for yourself and your fellow students must always be a primary concern.

IF YOU'RE NOT SURE WHAT TO DO, ASK YOUR INSTRUCTOR.

Electronic Devices and Circuits (EDC) – Lab

Student's Duties:

1. The students **are required to attend and complete each lab.**
2. They must do some mandatory **preparation before coming to the lab** and they also must present a pre-lab report that contains:
 - The title and the purpose of the work,
 - The parameters and the measuring method,
 - The electrical diagrams,
 - The experimental procedure,
 - Experimental data tables;The pre-lab can be the first form of the lab report.
3. The students must identify the devices, the materials and the apparatus they will work with, writing in the lab-report their characteristic data.
4. The students must accomplish the up mentioned steps when developing a lab-report, in terms with the lab guide and paying attention to the indications of the personnel.
5. The students must ask for explanations and try to assimilate the correct usage of the apparatus and instruments that interfere with their work.
6. When the experiments are finished the student must ask for the teacher staff's opinion regarding the accuracy of the results.
7. For each accomplished work the students must create a lab report, that should contain:
 - The title and the purpose of the lab report,
 - The parameters and the measurement method,
 - The schematics of the circuits,
 - The characteristics of the apparatus they used,
 - Tables containing experimental data and calculus,
 - All their calculus;
 - Analysis and conclusions.

The lab report must be carefully drawn out, the electrical diagrams must be pencil drawn utilizing the symbols of the apparatus and devices.

The conclusions must contain the personal notes and observations, as well as characteristics made on scale paper. For the graph characteristics some rules must be take care of:

- Chose the appropriate representation scales and indicate the size and measurement units,
- Place the points on the graph in the correct position without writing down the numerical values that correspond to the axes,
- When plotting the characteristic curves, their theoretical shape must be considered (plot between points and eliminate the ones with large deviation).

Basic Safety Rules

1. Coats, backpacks, books, and the like shall not be placed on equipment.
2. Students shall not work in the lab without instructor's permission.
3. **Conductive jewelry such as rings**, watches, bracelets, necklaces, and the like **shall be removed** while working with voltage above 24 V.
4. **All circuits above 24V shall be de-energized** when performing tasks such as moving test leads, removing or installing components, or making adjustments.
5. Troubleshooting and testing shall always be done using the **one-hand rule**.
6. Students shall ask permission of the instructor before using an open lab space.
7. Make sure the leads you use are in good repair. Bring any leads with loose connectors to your instructor for repair.
8. In the event of an emergency, shut down the power to the experiment. If necessary use the lab panic button and call your instructor.

Do not put yourself jeopardy too.