

ELEC 342: Electromechanical Energy Conversion and Transmission

Laboratory Rules and General Information

Laboratory experiments are integral to many courses that cover electromechanical energy conversion devices and their applications. All students must follow the following rules to ensure the safety and effectiveness of laboratory experiments. **Please also watch the following related videos on YouTube:**

<https://eng-services.ece.ubc.ca/videos/safety-videos/>

#1: General Safety:

<https://www.youtube.com/watch?v=cNpRxbpOJmM&t=17s>

#2: Explanation of Lab Rules:

<https://www.youtube.com/watch?v=E-fRWrChLvK&t=2s>

#3: Specific Electromechanical Devices Lab Safety:

<https://www.youtube.com/watch?v=7EaANGohgbs&t=5s>

1. Safety Rules

- a) All domestic and international students must have adequate medical insurance covering any possible injuries that may occur while in the Laboratory.
- b) Students must work in groups and are not permitted to conduct experiments in this Laboratory on their own time without being supervised or accompanied by a TA or Lab Engineer responsible for the Lab.
- c) Before conducting any measurements, all students starting the Lab sessions must be familiarized with these **Safety Rules** and acknowledge this by their signature on the **Sign-up Sheet**. **The course Instructor or TAs are responsible for providing the Sign-up Sheet.**
- d) Your safety is of the utmost importance. High-voltage equipment in the power Lab **can** cause serious **injuries or death**. Normal laboratory experiments should be conducted using reduced voltages not exceeding 50 Volts DC or AC for increased safety.
- e) Always double-check your wiring circuit. Avoid short circuits and/or inappropriate use of equipment. The power supplies in the Lab are capable of delivering **very high current**. High currents can lead to fires, heat hazards, and explosions, resulting in injury and damage to equipment.
- f) Have your circuit checked by a TA and/or Lab Engineer whenever necessary, especially if you are not sure and/or getting suspicious results or measurements.

- g) The Laboratory includes rotating machines and moving actuators that are capable of delivering high speed, torque and force. **Moving mechanical objects can cause serious injuries and damage to equipment if used or applied inappropriately.**
- h) To avoid hazardous situations, always **cover the dynamometer** machine with the protective plastic cover, **tightly couple and secure the subject electrical machine** or device (motor or actuator) under study with special screws.
- i) **Never stick your hands or any other objects** near the moving parts (shafts, couplings, etc.) of the machine while operating.
- j) Wear appropriate clothing and a hairstyle that is not likely to get in the way of rotating machinery and moving parts!
- k) Report any malfunction and/or failure of equipment to the TA and the Lab Engineer responsible for the Lab.
- l) In the case of an accident, immediately notify the TA and/or Lab Engineer responsible for the Lab, your fellow students/partners, and seek immediate appropriate medical help. **In the case of an emergency, call 911.**
- m) **No food and/or beverages** are allowed in the Laboratory at any time.
- n) Students carry full responsibility for any consequences, injuries and/or damages caused by (or as a consequence of) their negligence and/or inappropriate behaviour in the Laboratory or any other violation of the safety rules and precautions.

2. Attendance

- a) All students are required to attend and perform adequately. In order to pass this course, each **student is required to write reports for all experiments.**
- b) Attendance will be recorded by a TA. A **Sign-up Sheet** will be provided at the **beginning** and at the **end of every lab session.**
 - i) **At the beginning** of each Lab, each student must **Sign-In** in the appropriate Sign-up Sheet for that Section, thereby acknowledging his/her presence and compliance with the above **Safety Rules.**
 - ii) **Upon completing the experiment,** each student will be required to clean up the workplace and return the equipment and wires to their original place. After a TA checks the bench, each student will need to **Sign-Out.**
- c) Failure to be present for an experiment will result in losing the entire mark for the corresponding Lab.
- d) Students must not attend a Lab group/section different from the one assigned at the beginning of the class unless otherwise approved by the instructor. Attendance in the incorrect group will result in a reduced lab mark of **up to 50%.**
- e) If a student misses a Lab session due to illness and/or family crisis and can provide legitimate proof, he/she may be able to attend a different lab section or a make-up

session. In such cases, the student should contact the TAs and instructor as soon as possible and make appropriate arrangements/agreements about performing the Lab at another time.

3. Preparation and Performance

- a) Before coming to the Laboratory, each student **must read and review the appropriate sections of the lecture notes, textbook chapters, and the Lab Manual** for the current **Lab Experiment**. In particular, each student must **read the Tasks** and perform all necessary preparation (**Pre-Lab**) tasks corresponding to the Lab Experiment that will be performed that day.
- b) The TA will check your preparedness and the Pre-Lab sheet and may reduce your mark by up to **40%** or even **dismiss you** from the Lab **if you are not ready** to do the experiments.
- c) Record your **own** observations and calculations. The Lab time is limited, so you should use it effectively to complete all tasks and measurements. Be sure to record and present all your data very clearly.
- d) The TA may reduce your lab mark by as much as **50%** if you are noted to be busy with unrelated activities and/or disruptive to other students.
- e) The TAs may not let you **Sign-Out** before your workbench is adequately cleared. Leaving the Lab without **Sign-Out** and cleaning your workbench will invalidate your present Lab, and you will have to repeat it.

4. Accessing the Lab Computer (PC)

- a) You will need to log in to the PC on your Lab Bench. You should login **using your CWL account (not the ECE account)**. Ask your TA for help if you are unsure how to log in. Alternatively, the TA should provide you with the class login account and the corresponding password.
- b) After completing the experiment, store all your data files in your personal USB flash drive or email them to yourself from the lab computer. **Do not** save anything on the public Desktop, as these files might be removed after reboot. Please do not leave any files on the class account Desktop.

5. Lab Reports

5.1. Preparing the Report

- a) To pass this course, each student (or group of students) is (are) required to complete measurements and write **Lab Reports for all experiments**.
- b) Students are expected to work in pairs, discuss the problems in each lab experiment among themselves, share the work equally, and produce a group report.
- c) The calculations can be quite challenging. The students are encouraged to use advanced computational tools, such as **MATLAB, Excel**, etc., for calculations and plotting the results.

- d) Students are encouraged to discuss the problems they encounter in each lab experiment among themselves. However, the turned-in Lab Reports must show the individual work and reflect the personal understanding of the material by each student (or the group of students). The percentage (%) of participation for each student should be clearly indicated on the title page. Each student must sign the title page certifying that he/she participated in taking the measurements and preparing the given report.
- e) **Reports suspected of cheating will not be graded.** Cheating will result in a **zero mark (0)** and may qualify for withdrawal from the course and/or suspension from the University. Please see the [UBC Regulation on Cheating and Plagiarism](#). All instances of cheating will be reported in accordance with this policy.
- f) All reports must be typed. No exceptions.
- g) The Lab report **must contain at least** the following:
 - 1. Title Page (see sample Title Page below)
 - 2. Pre-Lab (if any), signed and dated by one of the TAs.
 - 3. Pages with measured data. The tables of measurements are included in the Manual for most of the experiments. These pages with tables must contain your own measurements/calculations and be signed/dated by your TA.
 - 4. For each Task, include necessary diagrams, tables of measurements, figures, graphs, equations, calculations, notes, etc.
 - 5. **Calculations & Analysis:** Include appropriate equations, calculations, comments and observations. Summarize the parameters of the studied device in a Table.
 - 6. **Summary Section:** This Section should include answers to the additional questions (if any). Here, you should also briefly state and summarize what you have learned from the experiments and subsequent calculations.
- h) When preparing a report, you may cross-reference the presentation of data and/or observations to the Task number in the Manual (e.g., Task #, etc.).
- i) It is best in terms of time management to start and finish your **Lab Report** on the same day or soon after you conducted the experiment, while your memory is fresh and you are on top of the material. Delaying writing the **Lab Report** till the due date will likely take more of your time and negatively impact the quality.

5.2. Submitting your Lab Report

- a) Reports are due precisely **one (1) week** (i.e., seven days) after completion of the experiment. The course instructor will specify the collection of reports. For example, the students may be required to submit them on **Canvas** by a particular time, precisely one week after conducting the experiment. The submission link will only be available until **11:59 pm** on the due date.
- b) Although students are expected to work in pairs (i.e., groups of two) on experiments and reports, each student must submit a report for every lab experiment using their own Canvas account.

- c) When submitting reports electronically, prepare your report as a single PDF file named: **YourName_StudentID_LabX.pdf**
- d) **All late reports must be emailed directly to the TAs**, who will record the time and date of submission. Late submission will result in a reduction of marks (10% per day). Lab reports submitted more than **three days** (including holidays) after the due date **will be accepted with zero (0) mark**.
- e) The following page is an example of the cover/title page of your reports.

This is an example of the cover page

ELEC 342

Lab Experiment #

Section L

Bench #:

Partners	Student ID #:	% participation	Signatures
T. Edison			
M. Faraday			

Date Performed: January 26, 2026

Date Submitted: February 2, 2026

6. Guide to Good Lab Report Formatting

6.1 Logistics

You are supposed to work in a group of two students. You and your lab partner are supposed to discuss all questions, collaborate, and work together on the **Lab Report**. The **Lab Reports** are submitted electronically through Canvas, and each student must submit the report against their account by the due date.

Your **Lab Report** must be typed and formatted nicely. Formatting can count up to 20 points of your total report mark. Your formatting style must be consistent throughout, including fonts, headings, equations, and figures. It is best to learn to carefully and adequately prepare your documents from the beginning, as it will help you later.

6.2 Report Layout

Sections and subsections must be spaced and easily distinguishable, like this document. Your report should have three (3) major Sections:

- 6.2.1 The first Section should contain all the **filled-out data tables** for each Task, including any calculated parameters, along with your answers to all the questions that were asked in each Task in the Experimental Part. This requires you to read the Manual carefully. You must include the question (paraphrasing is OK as long as you do not change the question) and label them by Task# Step# before answering them. Significant results should stand out (use *italics*, underline or **bold**). Usually, you should have the filled-out machine parameters at the end of the first Section.
- 6.2.2 The second part is **Calculation and Analysis**. You must include and label the questions by Task# and Question# before answering them. Equations and calculations must make sense! Do not expect us to mark something that does not make sense even to you. Again, highlight the essential results.
- 6.2.3 The last Section is your **Conclusion**, which summarizes your findings and what you have learned in this Lab. You may use appendices for codes, models, etc.

6.3 Figures and Plots

Figures and plots must be done in **Excel** or **MATLAB (or another equivalent tool)**. Plots must have titles and captions. Plots must have labelled axes. Axis labels must include units, and figures must also include legends. When plotting/fitting multiple datasets in a single figure, distinguish them using different colours, line styles, and/or dot styles. For example,

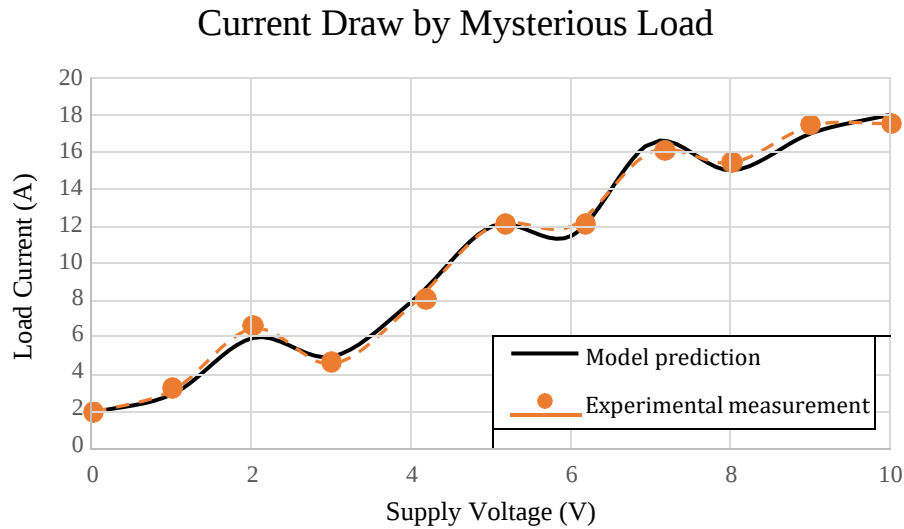


Figure 1. Comparison between model prediction and experimental measurement for the current drawn by the mysterious load at different supply voltage levels.

6.4 Short Answers

Your answers must be *concise* and *straight to the point*. Use the proper terminology you learned in class because we are looking for keywords to test your understanding. Usually, your answer should not be more than **three** sentences. If you do not know the answer, do not make something up; bring it up in the next Lab or tutorial for clarification.

6.5 Summary and Conclusions

After each Lab, please write a brief summary of what you have observed and learned by conducting the experiments and performing calculations and analysis of your data. Make concluding remarks about what has worked well, as expected according to the studied theory, and perhaps what has not worked so well, and the reasons why it might be the case.