

# BE 167L - Bioengineering Laboratory

## Lab 0: Laboratory orientation and lab notebooks

### Prelab reading

This lab course can never teach you all the techniques used in the various subspecialties encapsulated by the bioengineering field. Instead, the goal for this course is to teach you some important techniques for bioengineers, but more importantly, to teach you:

- How to work responsibly in a lab
- How to systematically create, collect, and analyze data of various types
- How to develop logically sound and thorough experimental designs which can answer a specific hypothesis
- How to identify the underlying elements of an obstacle in the lab and overcome it

Not only will you learn the specific techniques covered in this lab course, but you should be equipped to learn and use new and more advanced techniques in your future careers as bioengineers. You should begin to compile a skill set and mental tool-box from which you can pull ideas, references, concepts, and examples to help you face any new scientific challenge and problem that come your way, and not just the specific activities done in your lab sections. One of the key characteristics of good scientists and engineers is proper documentation of experiments and studies that he or she does. In Lab 0, you will get familiar with the teaching labs, the safety requirements, and lab notebooks.

### Preparation

Prior to the lab you must complete and bring the three certificates from Fundamentals, Chemicals, and General Safety. Also watch the lab primer video.

Also to lab, bring your lab coat, and a notebook as outlined by the syllabus.

### Purpose of a lab notebook

In BE167L, the purpose of your Lab Notebook is to record your experiments *while you are doing them*. You should have an entry for each lab session including your methods and raw data. You can print out and paste in protocols from online; however, you must make notes on any changes in your notebook during your lab session. Your raw data must also be recorded when you get the data during your lab session. Your TA will check your notebook to make sure you have recorded everything during each lab session. Each lab session (Labs 1-12) will be worth 1 pt towards your final participation grade.

### Lab notebook example

Below is a sample of the type of information that should be recorded in the lab notebook. The original instructions were printed out, and then annotations were made over the original instructions, specifying observations and deviations from the protocol. Your TA will discuss these in detail during the section, and specify exactly what he/she will be grading.

1. Weigh out 150 mg of the MEM powder supplied by the TA.
2. Dissolve your MEM powder in 15 mL of DI water into a 15 mL conical tube and label this tube as buffer.

3. Take out 2.5 mL of your solution and place it into a new 15 mL conical tube, do this again so that you have a total of 3 conical tubes
4. Label one tube acid+, and the other base+.
5. To your buffer solution add 25 mg of  $\text{NaHCO}_3$  then repeat steps 3 and 4, except label these tubes buffer acid+, and buffer base+.
6. To your tubes labelled acid+ add 500  $\mu\text{L}$  of the HCl solution provided by your TA, and to your tubes labelled base+ add 500  $\mu\text{L}$  of the NaOH solution provided by your TA. Record any observations at this time.
7. Measure the pH of each solution using the pH meter as demonstrated in the tutorial video, record measured values in your lab notebook. Consult your TA for further guidance if necessary.

### **Site-specific safety orientation**

During this session, your TA will also perform your site specific safety orientation. Be sure to follow along as your TA highlights the different rooms, their equipment, and relevant safety information.