

## CHEM 2403 LABORATORY OUTLINE

**Contact Info:**           **OFFICE:**    A-210 (back room) or A-106(end of hall-CSF).  
**PHONE:**    563-1877(Office)  
**E-MAIL:**    calvin\_howley@cbu.ca  
**WEBSITE:**  http://faculty.cbu.ca/chowley/

<b><u>Marking Scheme:</u></b>	<b>Total Point Value: 30 pt</b>
Data Sheets	10 pt
Quizzes	10 pt
Lab Reports(2)	10 pt

### **General Regulations and Notes:**

In order to receive a passing mark for the course, a student must pass the laboratory component of the course(15 pt/30 pt). The laboratory grade is determined from the submission of datasheets for completed experiments, quizzes, or Formal Lab Reports. See lab schedule.

Quizzes for a completed experiment are written during the next scheduled lab period and are conducted during the first 15 minutes of the lab period. Extra time and rewrites are **not** available for students who are late or absent. Data sheets are due at the end of the laboratory period. Data sheets not submitted at this time will be penalized and given a grade of zero **and** included in the overall lab mark.

Three of the experiments will be evaluated through the submission of a Formal Lab Reports instead of a datasheet/quiz. Lab reports are due at the beginning of the next laboratory period following the date on which they were completed. Lab reports not submitted at this time will be penalized 10% of the total value(1 pt) for each day late. Extensions will not be given for late laboratory reports and reports more than 7 days late will be given a mark of zero **and** included in the overall lab mark. See lab schedule for experiments requiring a Formal Lab Report.

All Formal Lab Reports are to be hand written in ink(no computer printouts) on the right hand page only and must be secured by staple or binder. All Formal Lab Reports are the property of the chemistry department. Reports will not be returned but are available for review. It is strongly recommended that students review the first Formal Lab Report for comments and recommended suggestions.

**Plagiarism** of datasheets/quizzes and Formal Lab Reports is a serious offense. Plagiarism is defined as the imitation of the language and thoughts of another author and the representation of them as one's own original work. See section: Academic Regulations – Ethical Behaviour in Academic Matters in the academic calendar. Work found to contain plagiarized material will be given a grade of zero and in some circumstances a student may receive a total lab grade of zero.

Students are encouraged to see me if there are any questions concerning the laboratory component of the course. The only requirement for assistance is that the student has reviewed the relevant material and has at least attempted to complete the experimental work.

Attendance in all laboratory periods is compulsory. Any student who misses up to **two(2)** scheduled laboratory period may be required to write a comprehensive Lab Exam to make up for

the missed material. Students who miss more than two laboratory periods or fail to write the comprehensive Lab Exam will receive a mark of 0 (zero) for the missed experimental data sheet and the corresponding quiz. The comprehensive Lab Exam cannot be used for experiments requiring a Formal Lab Report.

### **Cell Phones/Electronic Devices:**

The use of cell phones and other communication devices is strictly prohibited during the lab period. Permission for the use of electronic communication devices for limited purposes must be obtained from the instructor.

### **Clean-Up**

It is the responsibility of each individual student to clean and properly put away any equipment used during his/her experiment. Students are encouraged to remind others who do not clean up after themselves and not to clean up for them. Items often missed include the following:

- 1) Reagent spills left on balances.
- 2) Reagent bottles left open.
- 3) Glassware not put away or put away dirty.
- 4) Chemical spills on lab benches and countertops.

### **LABORATORY REPORT OUTLINE:**

All experimental write-ups are to be hand written in ink(no computer printouts) on the right hand page only and must be secured by staple or binder. Lab reports not stapled or bound will not be accepted.

Always compose your report in the third person. Never use the words "I" or "We."  
Write on the right hand page only.

A laboratory write-up consists of the following:

1. Title page - A page which contains the date, your name, title and partner's name (if applicable).
2. Purpose/Objective - A brief statement describing the main objective or goal of the experiment. For example: "The purpose of this lab is to analyse a series of data in a statistical manner."
3. Introduction - Approximately 1-2 pages in length. Do not paraphrase or recopy the introduction from the lab hand-out or other possible sources. Put in your own words.

It should include theory relevant to the experiment. Not all relevant theory is included in the lab hand-out. For example experiments that use acids and bases should include basic acid-base theory in the introduction. The description and basic operation of specialized equipment such as infrared spectrometers or UV spectrometers used in experiments must also be included. Reaction equations should also be included.

It should include definitions and formulae pertinent to the subject of the lab. Only include formulas used in the actual calculations.

4. Procedure - Do not recopy procedure. Write "Refer to lab hand-out (Title of Experiment)." Any changes made to the experimental procedure must be included.

5. Data - Be neat, concise and use tables to summarise data. Properly label all data and tables. Start this section by placing raw data in a table. An example of raw data would be masses weighed, concentration of reagents, and/or titration volumes. Data recorded during the actual experiment.

State model name and number of any instruments used. Also state any instrument settings such as wavelength. State the supplier and reagent grade of chemicals.

Graphs must be done in a spreadsheet software package such as Microsoft Excel. Graphs must use at least 90% of the page, experimental points should be clear distinguishable and axes must be clearly labeled and include the proper units. Graphs must have a proper title. A proper title would include Y variable vs. X variable and the stated chemical system. Graphs must be placed in the data section of your lab report. See sample graph posted in the lab.

6. Observations - Include any experimental observations such as color changes and/or experimental trends such as the absorbance increased with concentration. Do not explain. This will be done in the discussion.

7. Calculations - All data(masses, volumes used, etc.) must be properly labelled and include the proper units. All calculations must use the correct number of significant figures. Analytical balances record masses with four digits after the decimal and all burets, pipets, and volumetric flasks record volumes with two digits after the decimal.

Using data for your first trial briefly explain and illustrate all calculations. Do a sample calculation for each step in the experiment. Be sure to use 1 or 2 sentences to briefly explain each step of the calculations used to get the final result. Sample calculation only required for one trial. Results for subsequent trials must be summarized in a table. When averaging results, only average the final result.

8. Discussion - Include a restatement of the objectives and whether or not they were met.

Discuss any experimental observations, such as the solution turned blue, and explain all observations.

Discuss sources of error and explain how they would affect your results. If the experiment didn't produce the correct result discuss possible reasons. Were any assumptions made?!

Discuss your results. The results are what you are looking for and are stated in the purpose. For example if the purpose of the experiment was to determine the concentration of iron in a solution then the final result should be the concentration of iron. Compare your results with known values when applicable.

9. Conclusion - Restate the main objective of the experiment and give a brief statement that summarises your results. State the concentration of unknowns and be sure to include the unknown number. If the result is temperature sensitive be sure to include the temperature at

which it is recorded.

10. References - Include any sources that were used to write the report, for example, textbooks or reference materials.