

# CHEM 103: General Chemistry

Middlebury College

Spring 2018

– *Laboratory Syllabus* –

Location: MBH 563

Lab Time: Monday, Tuesday, Wednesday, and Thursday 1:30 – 4:15 pm

Instructor: Prof. Mary Jane Simpson, MBH 329, msimpson@middlebury.edu, 802-443-5978

Office Hours: Monday, Wednesday, and Friday 10 - 11 am, and gladly by appointment

## I. Rationale

The laboratory portion of CHEM 103 serves to introduce students to the scientific method, illustrate topics in general chemistry, and give students hands-on experience in a chemistry laboratory.

## II. Course Schedule

Date	Name of experiment	Due date
February 12-15	Lab 1: Significant figures and lab safety	February 19 - 22
February 19 - 22	Lab 2: Separation of a mixture	February 26 - March 1
February 26 - March 1	Lab 3: Colors, absorption	
March 5 - 8	Lab 4: Colors, emission	March 12 - 15
March 12 - 15	Lab 5: Spectrophotometric determination of iron	March 19 - 22
March 19 - 22	Lab 6: Deducing a molecular formula	April 2 - 5
April 2 - 5	Lab 7: Molecular modeling - digital and analog	April 9 - 12
April 9 - 12	Lab 8: Identification of an unknown volatile liquid	April 16 - 19
April 16 - 19	Lab 9: Titration of citric acid	April 23 - 26
April 23 - 26	Lab 10: Net ionic reactions	April 30 - May 3
April 30 - May 3	Lab 11: Enthalpy of dissolution	May 7 - 10
May 7 - May 10	Lab 12: Liquid nitrogen ice cream and check out	

### III. Learning Outcomes

By the end of this course, students will be able to:

1. Maintain safety in a chemistry laboratory;
2. Work collaboratively with a lab partner;
3. Follow instructions to complete a chemistry experiment;
4. Collect experimental data;
5. Analyze experimental data with Microsoft Excel and other software;
6. Explain likely sources of experimental error;
7. Formulate logical conclusions based on experimental results.

### IV. Format and Procedures

**Supplies:** The lab manual and worksheets will be provided online and in print, respectively at <http://sites.middlebury.edu/chem103lab/>. You need a pair of safety glasses. For the week of February 26, you will need a clean 100% cotton white t-shirt and/or any other 100% cotton white garments you would like to tie dye.

**Safety:** Everyone is responsible for maintaining a safe laboratory. Follow the safety rules at all times. Failure to follow lab safety rules will result in a participation grade penalty.

**Grading:** The lab counts as 25% of your final grade in CHEM 103. Grades are on a numerical scale out of 130 possible points. Points are awarded based on lab preparation (10 points total), lab participation (10 points total), and lab worksheets (11 labs at 10 points each). *Late assignments will lose 1 point per day unless an extension is granted by the instructor. Unexcused late assignments received after an answer key has been released (typically one week after the assignment was due) will receive no credit.*

**Attendance:** Attendance is required in order to perform experiments and complete lab reports. Please arrive on time; pre-lab discussions are brief and provide critical information. *If you miss a lab, you must make it up promptly. Excused absences are eligible to receive full credit, but unexcused absences automatically lose 25%.*

**Preparation:** *Read through the lab handout and complete the pre-lab portion of the lab worksheet* prior to arriving to lab. Your pre-lab assignment will be checked by the TA at the beginning of lab, but you can correct it during the pre-lab discussion. Plan on preparation taking approximately 1 hour each week.

### V. Academic Integrity

Academic integrity is of utmost importance in chemistry lab: you must never falsify your data. You are encouraged to work together in and out of lab and to discuss your lab reports with other students, however, the assignments you turn in should represent your own work, in your own words, based on your own original data. If you use outside resources, then you must cite your sources appropriately. Each student in this course is expected to abide by the Middlebury College Honor Code. Suspected violations will be reported to the Office of Judicial Affairs.

### VI. Accommodations for students with disabilities

Students with documented disabilities who believe that they may need accommodations in this class are encouraged to contact me as early in the semester as possible to ensure that such accommodations are implemented in a timely fashion. Assistance is available to eligible students through Student Accessibility Services. Please contact Jodi Litchfield at [litchfie@middlebury.edu](mailto:litchfie@middlebury.edu) for more information. All discussions will remain confidential.

## VII: Grading rubric for lab reports

	<b>Full credit</b>	<b>Partial credit</b>	<b>Minimal to no credit</b>
<b>Objective</b>	Accurate summarization of the goals of the lab written in complete sentences, and it is completed before coming to lab	Objective summarizes the procedure but fails to state the main goals of the lab, and it is completed before coming to lab	Objective is not complete before lab
<b>Pre-lab questions</b>	Answers are correct and were completed before coming to lab	Answers completed before coming to lab were initially incorrect, but they are corrected before submitting the lab	Pre-lab is not completed before lab; or, answers remain incorrect when lab is turned in
<b>Procedure outline</b>	All steps are shown with enough detail to complete the experiment without referencing the lab manual, and it is completed before coming to lab	Most steps are shown, but important details are missing; it is completed before coming to lab	Major steps are missing; or, procedure incomplete before coming to lab
<b>Data collection</b>	All data recorded clearly and completely	Data is unclear or details are lacking	A significant amount of data is missing
<b>Calculations</b>	Correct calculations with correct significant figures	Generally correct calculations with minor arithmetic or significant figure errors	Major errors in the approach to the calculations such as incorrect use of a formula
<b>Conclusions</b>	Complete, logical conclusion supported by the experimental results and outside research, if necessary	Incomplete conclusion such as results summarized without drawing any conclusions	Illogical and incomplete conclusion such as one not supported by experimental results
<b>Error analysis</b>	Correct answer with a correct, logical justification	Correct answer with an incorrect or illogical justification; or, incorrect answer with a logical justification	Incorrect answer with an illogical justification