

CHEM 052: Exploring Chemistry II

Spring 2019

Instructor

Joel M. Goldberg

Office Phone

802-656-4394

Email

Joel.Goldberg@uvm.edu

Office Location

Discovery Hall
Room W321

Office Hours

2:00 – 3:30 p.m., Tue
9:00 - 10:30 a.m., Wed

Class Meeting Times

Sectn A: Wed 2:20-6:20 pm
Sectn B: Thurs 1:15-5:15 pm

Class Lab Room

Discovery Hall
Room W407

Teaching Assistant

Robert “Bobby” Tracy

Course Overview

We continue our experimental exploration of foundational chemistry, begun last semester in CHEM 051. This semester we will start out with a collaborative effort with CHEM 048, and explore qualitative/structural analysis using spectra from chemical instrumentation (e.g., NMR, IR, and Mass Spec). We will then focus on laboratory experiences exploring chemical equilibrium (solubility, acid-base, and complex-ion) kinetics, thermochemistry, and electrochemistry.

Required Text/Course Materials

As with last semester, there are no required texts for this course. Handouts for each laboratory exercise will be provided, as needed, and will include literature references as necessary. You can continue to use the same lab notebook, safety goggles, etc. that you used last semester.

Course Learning Objectives

Together with the CHEM 048 co-requisite course, you will obtain a foundational understanding of the major ideas in chemistry, often demonstrated with organic compounds. This course serves to both support the work done in CHEM 048 as well as to explore other chemical concepts and methodologies fundamental to all areas of chemistry.

We will continue our use of a discovery or guided-inquiry structure in this course so that, in addition to the subject-based content, you will be exposed to and directed to solve chemical problems in the laboratory using the scientific method. It is our hope that the critical thinking and problem-solving skills you will learn and employ in learning chemistry this year will serve you as you explore disciplinary areas other than chemistry and will provide you with a template for exploration throughout your life.

Some specific learning objectives of this course (across both semesters) include understanding:

- the scientific method as a process for problem solving and learning chemical principles
- covalent and ionic bonding
- bond polarity and dipole moment
- intermolecular forces
- chemical equilibrium
- acids and bases
- pH, pK_a , pK_b
- reaction kinetics and mechanisms
- reaction energetics (thermochemistry)
- spectroscopic identification of organic compounds

(Note: this is not an exhaustive list and is subject to change based on the needs of the students in the class.)

But, most importantly, this is not a course in which the destination is most important – rather, we will be more concerned with process, *how* we come to understand the fundamentals of chemistry. I am less concerned that you know “the answer” and more concerned that you understand how to figure out what “the answer” is!

Grading

Your course grade will be determined by your point total at the end of the semester. There are 100 possible points that can be earned, according to the following distribution categories:

- Attendance: 20% (20 points). There are 10 lab classes this semester which, at 2 pts each, gives a total of 20 possible points for the semester. However, since this is a laboratory course, you are expected to be in lab each week for each experiment/exercise. There are no makeup lab sessions. **And: it is not possible to pass this course with more than two absences (excused or unexcused).**
- Lab Notebook: 20% (20 points). You will be expected to keep a notebook documenting all of your preparation for and work in the lab. Your lab notebook “carbonless copies” will be collected after each lab class session and assessed relative to the expectations and good laboratory practice presented to you in class. Each of these ten assessments will be worth 2 points, for a total of 20 possible points for the semester. While many of our labs will not require any advance preparation, for those that do require it, lack of evidence of preparedness for a laboratory experiment/exercise could result in your expulsion from the lab for the day, if it is determined that you are not prepared for working safely in the laboratory.
- Participation: 20% (20 points). We will rely heavily on working collaboratively in this course and your behavior in the laboratory will be assessed relative to your efforts to support the learning objectives of the class as a whole. No single person in this course will be able to perform all of the experimental measurements necessary to test the hypotheses posed and to answer the questions raised – collaboration and sharing of data and observations are essential to the success of the entire class. At the end of the semester, each student will be awarded up to 20 points based on their participation in the lab across the entire semester.
- Lab Reflections/Reports: 30% (30 points). While there will not be formal lab reports you will need to write for this course, after each lab experience there will be some kind of *prompt* to which you will be expected to think about and turn in a written reflection or (very brief) report prior to the next lab period. Typically, these will be no more than one page and will be assigned by Saturday of each week and due by the start of lab each week. There will be 10 of these assignments and they will be graded on a scale of 0 to 3 points.

- **ACS Exams: 10% (10 points):** Near the end of the semester, during one of our usual lab classes, you will be asked to take the both parts of the General Chemistry standardized, multiple-choice exam created by the American Chemical Society (ACS) (you took Part One of this exam early last fall). While you do not need to study for this, it would be a good idea to do a brief review of General Chemistry material – also, remember to bring a simple scientific non-graphing calculator (no other electronic devices will be allowed). Five points will be awarded for taking each of the two parts of the exam - points awarded are not based on your score on the exams, but it is expected that you do your best and complete both parts of the exam during the lab period (for which you will receive the full 10 points).

UVM Policies

Student Learning Accommodations: In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact the Student Accessibility Services (SAS) office on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. A student's accommodation letter lists those accommodations that will not be implemented until the student meets with their faculty to create a plan.

Student Accessibility Services
A170 Living/Learning Center
802-656-7753
access@uvm.edu
<http://www.uvm.edu/access>

Policy on Disability Certification and Student Support:

<http://www.uvm.edu/policies/student/disability.pdf>

Religious Holiday Policy Statement: *Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time.*

Academic Integrity: This policy addresses plagiarism, fabrication, collusion, and cheating.

<http://www.uvm.edu/policies/student/acadintegrity.pdf>

Code of Student Rights and Responsibilities:

<http://www.uvm.edu/policies/student/studentcode.pdf>

Center for Health and Well-Being: <http://www.uvm.edu/~chwb/>

Counseling and Psychiatry Services (CAPS): <http://www.uvm.edu/~chwb/psych/>

If you are concerned about a UVM community member or are concerned about a specific event, we encourage you to contact the Dean of Students Office (802-656-3380).

If you would like to remain anonymous, you can report your concerns online by visiting the Dean of Students website at: <http://www.uvm.edu/~saffairs/>

CHEM 052 - Spring 2019

Schedule - *Tentative*

	<u>Wed</u>	<u>Thurs</u>	<u>Topic/Experiment</u>
Jan	16	17	NMR & IR (Lecture and Demos)
	23	24	Mass Spec (Lecture and Demos)
	30	31	Solubility Equilibria
Feb	6	7	Kinetics
	13	14	Exam Week (CHEM 048)
	20	21	Thermodynamics
	27	28	Acid/Base Equilibria
March	6	7	Acid/Base Buffer Equilibria
	13	14	Spring Break
	20	21	Exam Week (CHEM 048)
	27	28	Electrochemistry I
April	3	4	ACS Meeting - Goldberg's Away ☹
	10	11	Electrochemistry II
	17	18	Exam Week (CHEM 048)
	24	25	ACS Exams
May	1	2	Check-out/Cleanup/Special Treat!