

Syllabus CHE 117 – Spring 2017

General Chemistry Laboratory II

Meeting Times and Locations:

Labs meet in LSC 002, 004, and 008 (ground floor of the Life Sciences Complex). Please check your myslice.syr.edu account for the meeting time and location of your section.

Instructors:

Gary Bonomo, 012A Life Sciences Complex
Email: gbonomo@syr.edu; Phone: (315) 443-7500
Office Hours: To Be Announced; also available by appointment

Dr. Deborah Kerwood, NMR Facility, 0-222 Center for Science and Technology
Email: djkerwoo@syr.edu; Phone: (315) 443-5925.
Office Hours: Available to meet by appointment

Head Teaching Assistant: Evelyn Myint - Email: nmyint@syr.edu

Registration and Scheduling Questions:

April LePage, 1-014 Center for Science and Technology, Email: amlepage@syr.edu, Phone: (315) 443-4109

Teaching Assistant Office Hours:

A copy of the Office Hours schedule is on Blackboard for students. Students are encouraged to attend *any* Teaching Assistants Offices Hours... they are *not* limited to their own Teaching Assistant's time slot.

Laboratory Manual:

“General Chemistry Laboratory II: CHEM 117 Lab Manual” by Yan-Yeung Luk, Kendall/Hunt Publishing Company, is available at the SU bookstore. ***Bring the manual to every lab class. Some labs are handouts.***

Preparation and Punctuality:

Your success in each experiment will be influenced by your pre-lab preparation. Read the lab description and procedure before you arrive in lab. Lab sessions begin promptly with important information concerning the procedures and safety considerations. If you arrive late, the Teaching Assistant may decide not to let you in for that lab session. Please turn in your assignments at the start of the lab.

Schedule:

January 16 and January 17 – NO CHE 117 LAB CLASS

January 23 and January 24 – NO CHE 117 LAB CLASS

January 30 and January 31

- Lab 01a: Safety Practices (*Safety Quiz is a course requirement, but does not count towards final grade*)
- Lab 01b: Percent Water in a Hydrate [**Handout**]

February 6 and February 7

- Lab 02: Volume of Mixing and Liquid Crystals

February 13 and February 14

- Lab 03: Vitamin C Clock Reaction

February 20 and February 21

- Lab 04: Equilibrium and Buffers

February 27 and February 28

- Lab 05: The Determination of an Equilibrium Constant [**Handout**]

March 6 and March 7

- Lab 06: Properties of Soap and Surface Tension

March 13 to March 14 – NO CHE 117 LAB CLASS [Spring Break]

March 20 and March 21

- Lab 07: Enthalpy and Entropy of Dissolving Salts

March 27 and March 28

- Lab 08: Alkalinity and the Carbonate System [**Handout**]

April 3 and April 4

- Lab 09a: Redox Potential
- Lab 09b: Determining Avogadro's Number [**Handout**]

April 10 and April 11

- Lab 10: Functional Groups of Organic Molecules: A Study of Polarity by Using Thin Layer Chromatography

April 17 and April 18

- Lab 11: Freezing Point Depression [**Handout**]
- *Review Session for Cumulative Assessment [Includes Hints on Making your Reference Sheet]*

April 24 and April 25

- *Cumulative Assessment [10% of your Final Grade for the Course]*

May 1 and May 2 – NO CHE 117 LAB CLASS

Learning Outcomes: This is the second semester of General Chemistry Laboratory (*CHE 107: General Chemistry Laboratory I* is a prerequisite). Students will build upon their previous learning. Upon completion of this course, students will be able to do the learning outcomes listed below. Each learning outcome (1-9) is further specified by the key points as they apply to this course under each outcome.

1. Develop problem solving skills

- A. Determine which experimental method can be used to measure a given quality or quantity.

2. Perform accurate and precise quantitative measurements

- A. Experimentally determine an equilibrium constant using UV/vis spectrophotometry. Also use an equilibrium constant to determine equilibrium concentrations from initial concentrations.
- B. Explain and apply the terms enthalpy, entropy, and Gibbs free energy. Also be able to calculate these values based on calorimetric experimental analysis and energy of formation values.

3. Interpret experimental results and draw reasonable conclusions

- A. Apply the techniques of dimensional analysis, unit conversion, and determine the correct number of significant digits when reporting experimental results.
- B. Determine the effect of temperature and concentration on reaction rate.
- C. Explain the properties of an emulsifier; such as soap and/or detergent.

4. Analyze data statistically and access reliability of results

- A. Calculate percent error and standard deviation, and also relate these to accuracy and precision.

5. Anticipate, recognize, and respond properly to hazards of chemical manipulation

- A. Apply the safety standards outlined in *Lab 01a: Safety Practices*. This specifically includes: familiarizing oneself with the safety hazards and required protection before laboratory work, following safety rules during laboratory work, and maintaining a clean work space and equipment.

6. Work effectively in small groups and teams

- A. Operate in a laboratory group of two to three; contribute approximately equally to task performed. In addition to performance in the laboratory, this includes being both prepared and punctual for class.

7. Training in ethical behavior

- A. Apply the standards of ethical behavior outlined in the *Syracuse University Academic Integrity Policy*.

8. Develop laboratory skills in chemical and instrumental methods of analysis

- A. Determine how to prepare a solution directly from a stock reagent and by preparing serial dilutions.
- B. Identify common sources of alkalinity. Explain that alkalinity is resistance to pH change from acid rain.
- C. Use and explain the experimental technique of thin layer chromatography (TLC). Calculate retention factor values (R_f) from this data and apply them to determine relative polarity of tested samples.
- D. Use a standard reduction potentials table to predict metal activity.
- E. Calculate the freezing point depression and molality. Experimentally determine molar mass of a solute using the colligative property of freezing point depression.

9. Learn about the impact of chemistry on society

- A. Evaluate experimental procedures using the Twelve Principles of Green Chemistry.***

*** These are a standard used by many professional scientific organizations to describe the term "Green Chemistry." They are described in detail in their original source, which is the book *Green Chemistry: Theory and Practice* by Paul T. Anastas and John C. Warner. However, a good summary can be found on the American Chemical Society (ACS) website:

<http://www.acs.org/content/acs/en/greenchemistry/what-is-green-chemistry/principles/12-principles-of-green-chemistry.html>

Safety in the Lab is Essential:

Please review the material covered in the *Safety Practices*, and follow the requirements in the *Chemistry Laboratory Safety Agreement*. The *Safety Quiz* must also be completed with a score of 100% as a requirement for the course. There is also a *Safety Contract* to be signed on the first day of lab.

- Wear approved safety goggles. Contact lenses are not permitted.
- Turn off cell phones and store personal items in the appropriate location.
- Know the location and operation of safety equipment (emergency exit, eyewash stations, safety showers, fire extinguishers, fire blankets, fire alarms and emergency telephones).
- Wear appropriate attire (no shorts or short skirts, no open toed shoes or loose clothing).
- Be prepared by reading the experiment prior to class.
- Do not rush an experiment or be careless in the lab.
- Never eat or drink in the laboratory.
- Never work alone in the laboratory.
- Only work on the assigned experiment.
- Use a fume hood when instructed.
- Check the labels before dispensing chemicals and inform instructor of any contamination.
- Inform instructor/TA of spills, splashes, injuries or any dangerous situations.
- Avoid touching hot objects and hazardous chemicals.
- Check Material Safety Data Sheets to be familiar with chemical hazards and precautions.
- Properly dispose of waste materials.
- Cleanup your workspace and wash your hands prior to leaving the laboratory.

Grading: This is a ONE credit Laboratory Course that is independent of the lecture CHE 116 with a separate instructor and grading. However, it does reinforce and supplement the lecture materials.

30% Pre-Lab Assignments

50% Post-Lab Questions

10% Lab Technique

10% Cumulative Assessment

Grade Scale: (your score will be rounded to the nearest whole number)

A	$S \geq 95$
A-	$90 \leq S < 95$
B+	$85 \leq S < 90$
B	$81 \leq S < 85$
B-	$78 \leq S < 81$
C+	$74 \leq S < 78$
C	$69 \leq S < 74$
C-	$64 \leq S < 69$
D	$55 \leq S < 64$
F	$S < 55$

Your score so far is listed as the "Weighted Total" on Blackboard.

IMPORTANT: Check Blackboard and your SU email several times per week for Announcements. Your TA will record your grades to Blackboard – check them for accuracy when your graded papers are returned. PLEASE KEEP ALL GRADED ASSIGNMENTS RETURNED TO YOU!

Pre-Lab Assignments:

Pre Lab Assignments are in the lab manual or handouts and are 30% of your grade. **They are due at the beginning of each lab**, with the exception of the first lab (no pre-lab for *Percent Water in a Hydrate*).

These assignments are meant to prepare you before you come to the lab. **Late Pre-Lab Assignments are not accepted**, as this would defeat the purpose of a *Pre-Lab* helping to prepare you for the lab.

Please Note: For an absence due to extenuating circumstances (see “Absence” section), your Pre-Lab Assignment is due within one day of your absence. The only exception is in the case of an extended absence.

Post-Lab Questions:

Carefully record your observations and data for all experiments. **Your TA must sign your notes and check the equipment you used for that session before you leave lab.** Post-Lab Questions are in the lab manual or handouts and are 50% of your grade.

The Post-Lab Questions must be turned in one week after the lab. A deduction of 5 points will be made for Post-Labs one day late, with an additional 5 points deduction for each subsequent day. However, assignments later than one week after it is due will receive a grade of zero. For example, a grade of 90 would become a grade of 80 if the Post-Lab was two days late, $90 - (5 \times 2) = 80$.

Please Note: For an absence due to extenuating circumstances (see “Absence” section), your Post-Lab Questions is due within one day of your absence. The only exception is in the case of an extended absence.

Lab Technique:

This grade will be determined by your TA based on his/her observation of your participation & laboratory technique, preparedness, punctuality, attention to safety and cleanup of lab space. A rubric of how this grade is calculated will be provided.

Cumulative Assessment: [Attend the Review Session; this is very helpful for studying]

The Cumulative Assessment is a written examination that occurs during the lab class on the last week of classes in your normal lab room. You have the entire lab class period, however it will probably take you significantly less time than this. There are 32 multiple choice questions based upon the Learning Objectives outlined earlier in the syllabus; in that order. Each question is relatively short in length and is targeted toward assessing if you mastered a specific Learning Objective; there are two questions per Learning Objective.

Bring Number 2 Pencils and know your SUID Number and Lab Section Number; as you will need these to fill out the answer sheet. You are allowed to bring a Calculator (Scientific or Graphing), however you may not have any reference materials saved on the device. **You will be provided with a periodic table and standard reduction potentials in aqueous solutions table, the only other reference material you will be allowed is a double-sided note sheet (8.5” x 11”). Your note sheet must be handwritten and prepared by you; you cannot use a photocopy or typed sheet.**

You may not discuss the questions on this Cumulative Assessment with other students!

Submission of Work [On-Time]

You must submit your labs to the Teaching Assistant at the beginning of the Lab Section.

Submission of Work [Late Post-Lab Questions and/or Make-up Work from Absences]

You must scan the completed assignment and email it to your Teaching Assistant as an attachment (email address on Blackboard) and please copy the Instructors; no other form of submission will be accepted. Your Teaching Assistant will reply to you within one day of receiving your email to confirm receiving your email.

There are numerous scanners on campus (such as in the various libraries), and it is your responsibility to find access to one. If there are any technical difficulties in submission, you must contact your Teaching Assistant before it the completed assignment is due.

- See the Section “Post-Labs Questions” for details on late submissions.
- See the Sections “Absence” and “Schedule Completion of Missed Work” for details on make-up work.

Receiving Grades

Grades are posted on Blackboard within one week of submission, you will be informed of any delays via email. It is your responsibility to check Blackboard at least weekly verify that your grade is posted correctly.

If you do not see your grade posted on Blackboard that you submitted, it is your responsibility to **email** the Instructors and your Teaching Assistant **within one week of day the grade should have been posted.** *Any later than this, and any request to investigate your grade will be denied.*

Receiving your Graded Assignments

Graded assignments will be returned during the next lab class following submission, you will be informed of any delays via email. If you do not pick up the lab class in which the graded assignment was returned, then email Elizabeth Molloy (Chemistry Main Office, SciTech 1-014; eamolloy@syr.edu) and schedule a time to pick it up **within one week** of the day they were be returned in class (hours available for pick-up are Monday to Friday, 10:00am to Noon and 1:00pm to 3:00pm; the document can also be scanned and emailed to you if you are unable to stop by the office).

If you suspect that an assignment you submitted is missing (i.e. was not returned to you as indicated above), then it is your responsibility to email the Instructor **within one week** of the day they would be returned in class. *After this point, any requests for returning of a graded assignment will be denied.*

Cumulative Assessment:

You cannot pick-up the original Scantron for the Cumulative Assessment, however you may pick-up a photocopy and/or a scanned copy by emailing Elizabeth Molloy (Chemistry Main Office, SciTech 1-014; eamolloy@syr.edu). You will be emailed when the grades for the Cumulative Assessment are posted on Blackboard, and you have **one week** from this point to request to pick it up. *After this point, any requests for the Cumulative Assessment pick-up will be denied.*

Questions about Grading

If you feel that a grade you received is in error, you may ask your Teaching Assistant about it **within one week** of the day they were be returned in class. If the Teaching Assistant finds the grade to be in error, it will be updated within one day on Blackboard. If the Teaching Assistant does not find the grade to be in error, **you may appeal this by emailing the Instructors if you wish during this same time limit.** *After this point, any requests for your grade to be reviewed further will be denied.*

Lab Technique:

You will be emailed when the grades for the Labe Technique are posted on Blackboard, and you have **one week** from this point to question them (which must be done via an email to both the Instructors and your Teaching Assistant). *After this point, any requests for your grade to be reviewed further will be denied.*

Absence

You are expected to attend every lab class; a missed lab will count the Post-Lab Questions for that lab as a grade of zero. Extenuating circumstances exist that provide exceptions to this policy; which are outlined below. If you believe that you have an extenuating circumstances not covered under this list, please contact your Instructor to see if this constitutes an exception to the policy. **For all forms of extenuating circumstances, proper documentation is required and any missed work must be completed.**

In the case of an extended absence (more than a day), please contact the Dean's office in your college: 315-443-9396 for Arts & Sciences 315-443-3604 for Engineering

Religious Observances

The Religious Observances Policy (http://supolicies.syr.edu/emp_ben/religious_observance.htm) at Syracuse University recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. **Students will have access to an online notification form through MySlice for two weeks beginning the first day of class.** Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes.

Student Athletes

If you will miss a lab due to conflicts with game schedules, etc., **you and your coach or athletic advisor have to contact your Instructor before the date when the conflict occurs.**

Serious Illness:

If you will miss a lab session due to illness or injury, you must provide a note from the Health Center or your private physician to your Instructor. **The note must explicitly say that you are unable to attend the lab class;** a note that says that you visited the Health Center or your private physician is not sufficient.

Death in the Family:

You must receive a **note from your Dean's Office** documenting this.

Schedule Completion of Missed Work

This is only allowed due to extenuating circumstances; see "Absence" above. Contact your Instructor to complete missed work. There are two possible options, which are listed below. *You have one week from the makeup lab or receiving the data set to complete the Post-Lab Questions (or else it is a grade of zero).*

- Attend a different lab section during the same week as the absence. Instructor approval is required ***before*** attending lab sessions.
- Complete the Post-Lab Report using an Instructor provided data set. This is subject to Instructor approval, and is ***only allowed if attending a different lab session during the same week is impossible.***

Disability Related Accommodations

If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), <http://disabilityservices.syr.edu>, located at 804 University Avenue, room 309, or call (315) 443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented disabilities “Accommodation Authorization Letters” as appropriate. As accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Academic Integrity

Complete academic honesty is expected of all students. Please review the Syracuse University Academic Integrity Policy (http://supolicies.syr.edu/ethics/acad_integrity.htm). Any incidence of academic dishonesty (i.e. plagiarism, cheating) will result in both course sanctions and formal notification to the Associate Dean of Undergraduate Affairs of the College of Arts and Sciences and to the corresponding Dean of your own College, if you are not an A&S student. In this course, students are allowed to work/study together, but quizzes and lab reports must represent the work of the individual student.

Students will receive an *Academic Integrity Agreement* to sign on the first day of lab. This specifies that they are aware of this policy and reiterates that they will abide by it.