Stony Brook University
Department of Chemistry
CHE 134
General Chemistry Laboratory II
Winter 2023

**Course Description:** Designed to familiarize students with (1) some chemical and physical properties of substances, (2) techniques of quantitative chemistry, and (3) scientific methodology. Three hours of laboratory or related activity per week. CHE 133 and CHE 134 may not be taken for credit in addition to CHE 154. This course has an associated fee. Please see www.stonybrook.edu/coursefees for more information.

*Prerequisites:* CHE 133

Pre- or Corequisite: CHE 132

1 credit

**In Lab Meeting Times:**

Lab meets in the Centers for Molecular Medicine (CMM) rom 127.

Tuesday – Friday 9:30 AM – 12:30 PM. See last page of the syllabus for a detailed schedule

**Learning Objectives:**

1. Demonstrate how to properly conduct a scientific experiment.
2. Demonstrate proficiency with some of the basic experimental techniques of chemistry.
3. Demonstrate the ability to make measurements precisely, to record and analyze data with error analysis.
4. Demonstrate the ability to assess the quality of data through a comparison with class data
5. Demonstrate the ability to decide when and how to modify one's experimental method.
6. Demonstrate the ability to interpret the results of an experiment.
7. Demonstrate the ability to communicate experimental results through an oral presentation.

**Text and Materials:** All the laboratory documents and assignments will be posted on Brightspace. Other required materials are safety goggles, which meet legal requirements for splash protection (ANSI Z87.1 + D3), and a laboratory notebook that has duplicate copies and its pages numbered (75 page minimum). You are permitted and encouraged to use your notebook from CHE 133. You may also wish to wear protective gloves during some laboratory exercises; household dishwashing gloves are suitable for this purpose.

The chemistry department will lend laboratory coats to you for the semester. You will receive your lab coat in a protective bag on the first day of class. It is your responsibility to bring your coat to the lab every time class meets. Lab coats will be collected on the last day of class.

**Staff:** Professors Alicia Mullaley (Chemistry 505) and Suan Quah-Ivarson (Chemistry 451) oversee CHE 134 for Winter 2023. Teaching Assistant (TA) Veronica Duncan will hold office hours (Chemistry 215) and help with grading. Ms. Lobna is our stockroom manager and holder of all necessary equipment and reagents. You are expected to treat all staff members respectfully.

Office hours: Dr. Alicia Mullaley by appointment via zoom

Dr. Suan Quah-Ivarson by appointment via Zoom

If you need to meet at another time, please email the professors to schedule an appointment. Professors will do their absolute best to respond to emails within 24 hours. (weekends excluded).

**Student Responsibilities:**

- Be prepared for the lab by completing all pre-lab assignments in advance.
- Complete all experiments and post-lab assignments on-time.
- Ask questions when something is not clear to you.
- Work cooperatively with your classmates so that all may learn.
- Know and comply with course and safety policies, including any announcements made in class or on course websites.

**Philosophy and Goals:** A scientist's job is to formulate and answer questions. They start with a hypothesis they would like to test. They design experiments to gather data that either supports or disproves the hypothesis they are trying to test. When they perform an experiment in the lab, they not only gather data, but also determine whether their data is valid. Once they feel confident in their data, they need to interpret what the data means. Sometimes the data doesn't answer the question, so they go back to the drawing board and redesign their experiment. This cycle continues until the data disproves or supports the hypothesis. Once they have reached a conclusion, scientists communicate these results through publications and conference seminars.

The key is that the scientist doesn't know the answer beforehand. The scientist needs to rely on their assessment of the quality and validity of their data. You will find that the concepts illustrated in the laboratory exercises will often proceed the lecture.

The purpose of this course is to allow you to develop skills that chemists use and practice the scientific method. Some of the exercises in this laboratory course will help you to develop general laboratory skills. These experiments will be presented with specific instructions. When you have obtained precise and accurate results, this will build your confidence in the reliability of your technical skills. Other laboratory exercises will be more open-ended and will require you to devise and carry out your own procedures for answering questions while working in small groups. By comparing your data with class data, you will be able to assess the quality of your data. Quality data is essential to be able to determine the relationship between the variables you

are measuring. You will develop your communication skills through a group power point presentation to be given at the end of the semester.

**Class Meetings:** Attendance is required. A sign-in sheet, provided by your TA, will be available at the beginning of every lab period. Necessary lab materials will not be available at times outside the normal meeting times. **Online assignments will be posted to Brightspace**. **We do not accept late online assignments due to internet/technical difficulties.**

**Make-ups:**

Make-ups will only be given for **medical emergencies**. We offer one make-up per semester. Contact your TA immediately to schedule a make-up.

Late work will only be accepted in cases of **medical emergency**. You must email your TA (when possible before the due date) to discuss your emergency.

**Grades:** The final grade for this course will be based upon laboratory results (precision and accuracy), your interpretation of your results, pre- and post-lab assignments, and group presentation.

You will be required to always wear your safety goggles in lab. By adhering to this safety requirement, you will receive 5 points per lab period.

Safety: (5 points per experiment) 25 points

You will need to prepare your laboratory notebook in **advance** of the lab period. This will follow the notebook format given on page 7 below. All data and observations must be written directly into the lab notebook in ink. The duplicate copies will need to be initialized by your TA when they are submitted at the end of the lab period for grading.

Notebook: (10 points per experiment) 50 points

Most of the laboratory experiments include a pre-lab assignment. This may be a reading assignment, watching a demonstration video or an internet search. **At the beginning of lab, only within the first ten minutes of lab**, you will take a pre-lab quiz. (No cell phones will be allowed during this time). If you are late for lab, you will only have the remaining time to complete the quiz. If you are more than 10 minutes late, you will receive a zero.

Pre-Lab Quizzes: (10 points each lab section) 40 points

After each experiment is complete there will be a corresponding post lab assessment quiz on Brightspace. The quiz will go live after you finish the experiment. Due date will be posted on quiz instructions.

Post-Lab Quizzes: (20 points each experiment, EXP 1-4) 80 points

Lab cleanliness and hygiene are fundamental to the overall efficiency of lab operations. You are required to clean your benchtop, glassware, and any equipment used during the experiment. You will be required to sign-out when you are finished and obtain your TA's signature. Your TA will only sign if you properly cleaned.

Cleanliness: (5 points per experiment) 25 points

This course will culminate with an oral group presentation. You will be given assignments during non-experiment days to help prepare you for your presentation.

Oral Group Presentation: 100 points

**The Final Grade:**

| | |
|---|---|
| Safety: (5 points per experiment) | 25 points |
| Notebook: (10 points per experiment) | 50 points |
| Cleanliness: (5 points per experiment) | 25 points |
| Laboratory Experiments (100 points per report) | 400 points |
| Oral group presentation | 100 points |
| Non-experiment day (online) assignments | 100 points |
| Pre-Lab Quizzes: (10 points, no quiz for mod exp) | 40 points |
| Post-Lab Quizzes: (20 points, no quiz for mod exp) | 80 points |
| **Total points possible** | **820** |

**Basis of grade determination:**

A 93-100; A- 90-92; B+ 87-89; B 83-86; B- 80-82; C+ 77-79; C 74-76; C- 72-74; D+ 70-72; D 60- 69; F 0-59

*NOTE: These letter grades are threshold scores only. Actual final scores needed to earn a certain letter grade may be lowered if warranted based on the difficulty of the quizzes and experiments. In other words, if your final total points in the course equal a 93%, you will not earn less than an A; however, the threshold for an A may be lower.

**Course Info:** General information about the course staff, assignments, syllabus, and policies is available on Brightspace. It is accessed via

https://mycourses.stonybrook.edu/d2l/login?utm_source=herobutton . If you used Brightspace during a previous semester, your login information (Username and Password) has not changed. If you have never used Stony Brook's Brightspace system, your initial password is your SOLAR ID# and your username is the same as your Stony Brook username, which is generally your first initial and the first 7 letters of your last name.

For help or more information, see: https://it.stonybrook.edu/help/kb/brightspace-d2l-training-options . For problems logging in, go to the helpdesk in the Main Library SINC Site or the Union SINC Site, or call: 631-632-9602 or e-mail: helpme@ic.sunysb.edu.

Student Accessibility Support Center (SASC) Statement: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact the Student Accessibility Support Center (SASC), ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the staff at the Student Accessibility Support Center (SASC). For further information, please visit: http://www.stonybrook.edu/ehs/fire/disabilities

Academic Integrity Statement: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management Statement: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

**Laboratory Notebook:**

You will be required to obtain a laboratory notebook that generates duplicate copies and has its pages numbered. 75 pages minimum.

Before each experiment, you are required to read the lab experiment, understand the concept behind it and write out an abbreviated procedure. This includes generating tables to enter your data within prior to starting the experiment. All your data will be entered directly into your lab notebook in pen. All your duplicate copies will be collected at the end of each period.

The level of detail required is such that if another student or scientist could reproduce your results based upon the procedure and data entered in your lab notebook.

Notebook Format:

| | |
|---|---|
| Experiment | |
| CHE 134 | Date |
| Lab Section | Name: |
| TA: | Partners: |

**Purpose**: In one or two sentences, describe the main objective of the laboratory experiment (what questions you will attempt to answer and how).

**Procedure:**
Each line (numbered) should describe one step.
Include any specific equipment required (may include a diagram)
This is to facilitate the execution of the lab without re-reading an entire paragraph to find out where in the procedure you have left off.
Any modifications to the procedure executed during the experiment should be recorded.

**Results:**
Record any observations…evolution of heat, formation of a gas, precipitate, color change.
Tables should be generated in advance of the lab period (**copy the tables in the handouts**) to organize data as it is being recorded.

**Discussion:**
You will need to assess the quality of your data. If more than one trial was run, you will need to report an average value, average deviation, and percent deviation.
If the true value is known either from the literature or the class average, you will need to report a percent deviation.

## Schedule

| Date | Exercise | |
|---|---|---|
| Wed. 1/4 | Read Syllabus, watch Safety video (online)<br>Syllabus quiz, Safety quiz (online)<br>Online assignment #1: Measurements, Accuracy and Precision<br>Propagation of Error Assignment<br>Redesigning an Experiment | <br>30 points<br>Reading<br><br>10 points<br>Reading |
| Thur. 1/5 | Experiment #1: Iron in Water<br>Post–lab quiz | 100 points<br>20 points |
| Fri. 1/6 | Experiment #2: Kinetics<br>Post–lab quiz | 100 points<br>20 points |
| Tues. 1/10 | Experiment #3: pKa of an Unknown Acid<br>Post–lab quiz | 100 points<br>20 points |
| Wed. 1/11 | Online assignment #2: Group Contract Form,<br>Group Project Form<br>Poster Presentations<br>Discussion Board | 10 points<br>10 points<br>Reading<br>10 points |
| Thurs. 1/12 | Experiment #4: Modification of EXP 2/3 | |
| Friday 1/13 | Experiment #5: Buffers<br>Post–lab quiz | 100 points<br>10 points |
| Tues. 1/17 | Online assignment #3: Poster Drafts/Critiquing | 10 points |
| Friday 1/20 | Group Presentations | 100 points |