

**CHEM 142M PRINCIPLES OF CHEMISTRY II (MAJORS)
Fall 2023 SYLLABUS (subject to change)**

Professor: Sophya Garashchuk (GSRC 408, 803-777-8900; garashch@mailbox.sc.edu)

Lab: Augustus Way Fountain (STB 227, 1112 Greene Street 803-777-3904; fountaa@mailbox.sc.edu). See the lab portion of this Syllabus, pp 8-12

Office Hours: Tue 2-3 pm, Thu 11:30-12:30. GSRC 407 or virtual via Microsoft Teams. Appointments are always welcome.

TA homework help TBD

Attendance: **Attendance is required.** This course is offered as “face-to-face” only and attendance in person is expected. Students must attend all classes in the format they are offered (For example, students are expected to attend in-person classes in person). Students who miss classes due to COVID quarantine, a diagnosed health condition or registered disability should contact the Undergraduate Student Ombudsman or Student Disability Resource Services to document the reason for their absence. Students with documented absences may be offered self-study materials and have the opportunity to reschedule exams or assignments at the instructor’s discretion after applying the syllabus statements regarding missed class, assignments or exams. One missed midterm will be replaced with the score from the final exam scaled accordingly.

The University Attendance Policy can be found at this link (https://sc.edu/about/offices_and_divisions/faculty_senate/faculty-toolbox/documents/attendance_policy_approved_for_21_22.pdf). You must attend at least 75% of the class meetings to pass the course. Students sit in assigned seats and attendance is taken daily.

Lecture: TTh 10:05 – 11:20, STB 417. Be prompt and come to class prepared. **Homeworks** are assigned through Pearson’s Mastering (instructions on Blackboard under ‘Syllabus and schedule’). You may not bring food or drink into the lecture hall.

Other meeting times:

Section		M01/M02	
Recitation Jones 104	Sachith Wickramasinghe sachith@email.sc.edu	Mon 9:40 – 10:30 am	

Lab		Mon	
212 STB		2:20 – 5:20 pm	
TA	Corbin Witt	cwitt@email.sc.edu	

Credit: 4 credit hours.

Prerequisite: Grade of C or higher in CHEM 141.

Text: *Chemistry: The Central Science*

Theodore L. Brown, University of Illinois at Urbana-Champaign [and five others].

15th edition, New York: Pearson. **Mastering with etext ISBN for 18 week access is 9780137542932.**

Homework: You will need to register for the Pearson's Mastering Chemistry linked to Blackboard. The instructions on how to register are on Blackboard. You should plan for at least an hour of reading and at least 30 minutes to an hour for the assigned problems. Late assignments will receive a 10% reduction in the total possible points per every 24 hours.

Recitation: Recitation: homework is discussed, a quiz is taken, and lab safety issues are reviewed. Be sure you have read the lab prior to recitation.

Learning Management System: The University uses **Blackboard** as our Learning Management System (LMS). All assignments and course information will be found there. Check Blackboard often for announcements and up-coming assignments, laboratory exercises, and quizzes.

Midterm Exams: Exams will be administered face-to-face during a normal lecture period.

Announced quizzes will also be administered face-to-face.

Final Exam: The Final Exam will be administered on Thursday, 12 Dec 9:00-11:30 am

Grading:	3 Exams (125 pt each)	125 x 3
	Homework	100
	Quizzes	25
	Laboratory*	250
	Final exam	250
	TOTAL**	1000

*The total laboratory points will be assigned out of 350 (reports) and 50 (lab notebook). They will contribute 25% to your total grade. ** To pass the class you need to have at least 62.5% for the lab portion of the course and at least 60% on the 4 exams, regardless of the total number points.

The grading scale may be adjusted based on overall class performance. Following final exams, approximate letter grades may be discussed. All required elements of the course are to be completed within the normal term. Failure to complete all the elements on time will result in a grade of F. Incompletes will only be assigned in unusual circumstances.

Grading Scale:

A	89-100%
B+	85-88%
B	78-84%
C+	73-77%
C	65-72%
D+	60-64%
D	50-59%
	F<50%

Hazardous Weather:

In case of emergency closure assignments will be posted on blackboard. Emergency closures are announced on the university Carolina alert website <http://carolinaalert.sc.edu/>

COVID-19:

While instruction will take place fully in-person, changing conditions at the university may require that this course move to hybrid in-person/online or fully online with little notice.

Calculators:

Programmable calculators (any that are approved for the AP test) may be used for examinations, but computers may not.

Cell Phones

All cell phones and pagers are to be turned **off** or **silenced** during class (not on vibrate). All cell phones are to be put away out of view during class; there is no text messaging, web browsing, etc. during class. There will be no eating during class time. Failure to adhere to these classroom rules may result in your being dismissed from class and/or an academic penalty.

- Academic Responsibility** Your enrollment in this class signifies your willingness to accept these responsibilities and uphold the Honor Code of the University of South Carolina. Please review the Honor Code Policies. Any deviation from this expectation can result in a course failure and a referral to the Office of Student Conduct and Academic Integrity.
- Cheating, plagiarism, copying from old reports, and other forms of academic dishonesty in connection with any portion of this course will normally result in failure of the course. Cooperating in academic dishonesty will also result in failure. Submitting an online homework answer without working through the problem independently is considered cheating. All incidents of academic dishonesty will be reported to the student's College for possible further disciplinary action.
- Copyright:** Lectures and course materials (which is inclusive of my presentations, video recordings, tests, exams, outlines, and lecture notes) maybe protected by copyright. You are encouraged to take notes and utilize course materials for your own educational purpose. However, you are not to reproduce or distribute this content without my expressed written permission. This includes sharing course materials to online social study sites like Course Hero and other services. Students who publicly reproduce, distribute or modify course content maybe in violation of the university's Honor Code's Complicity policy, which states: sharing academic work with another student (either in person or electronically) without the permission of the instructor. To best understand the parameters around copyright and intellectual property review ACAF 1.33 "Intellectual Property Policy".
- Collaboration:** A student's grades are to represent to what extent that individual student has mastered the course content. You should assume that you are to complete course work individually (without the use of another person or un-cited outside source) unless otherwise indicated by the instructor. It is your responsibility to seek clarification if you are unclear about what constitutes proper or improper collaboration.
- Lab Assignments:** In this course students will complete laboratory assignments. You are encouraged to work together in the lab to complete the data collection. However, all lab reports must be the work of the individual student and may not be copied from another student's work, the text or any other source. Any discussion with your lab section should be limited to general terms and big picture concepts. Avoid sharing your lab report with other students electronically.
- You are required to maintain a laboratory notebook in this course. All laboratory notebooks will meet the following requirements. They will be in a hardbound book

format, with sewn pages so that the book lies flat when open. They will be professionally bound, tamper-evident, and of archival quality acid-free paper in 1/4" (6 mm) grid format. The notebook shall also have a "Table of Contents" page. An example can be found at https://www.amazon.com/BookFactory-Notebook-Laboratory-LIRPE-096-LGR-LBT1-R/dp/B00AZYEP7A?ref=ast_sto_dp&th=1&psc=1.

To enter the laboratory and complete the assignment, you must have ANSI approved laboratory safety glasses or goggles (provided by the student), long pants that completely cover the leg (no rips, tears, or holes), and shoes that completely cover the foot. A laboratory coat will be provided for you.

- Citations When citing references or outside published works in laboratory reports students shall follow the "ACS Guide to Scholarly Communication" available electronically at <https://pubs.acs.org/doi/full/10.1021/acsguide.40303> .
- Reusing Course Materials: The use of previous semester course materials is not allowed in this course. This applies to homework, projects, quizzes and tests. Because these aids are not available to all students within the course, their use by any individual student undermines the fundamental principles of fairness and disrupts your professor's ability to accurately evaluate your work. Any potential violations will be forwarded to the Office of Student Conduct and Academic Integrity for review.
- Disability Services Reasonable accommodation is available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Student Disability Resource Center: 777-6142, TDD 777-6744, email sasds@mailbox.sc.edu, or stop by the Close-Hipp building room 102. All accommodations must be approved through the Student Disability Resource Center. Any disability-related absences should be reported through a disability coordinator within 24 hours of the absence when possible. If the absence is not reported in a timely manner, accommodations will not be allowed.
- Expectations of the Instructor: The instructor is expected to facilitate learning, to answer questions appropriately, to be fair and objective in grading, to provide timely and useful feedback on assignments, to maintain adequate office hours, and to treat students as he would like to be treated in their place.
- Content: Chem 142 is taught in a rigorous fashion for serious students. The course presumes a solid background in science and mathematics. It is aimed at developing independent thought and problem-solving abilities. The principles of chemistry will be illustrated with accurate and thought-provoking examples.

Learning
Outcomes:

Upon successful completion of Chemistry 142M students will be able to:

- Demonstrate knowledge of molecular-level chemical processes including thermodynamics, chemical equilibrium, acid-base reactions, electrochemistry, chemical kinetics, coordination chemistry, introductory organic and biochemistry, polymers, and nuclear reactions.
- Master the skills of solving practical numerical problems in chemistry.
- Work collaboratively with other students for teaching and learning chemistry.
- Demonstrate a mastery of historical knowledge of chemical events as compared to modern day practices.
- Demonstrate proficiency in assembling basic laboratory glassware, performing fundamental laboratory techniques, making and recording relevant experimental observations, and interpreting the results.
- Discuss the important scientific discoveries that lead to the development of modern chemistry (Carolina Core Scientific Literacy).
- Demonstrate understanding that the natural world has an atomic and molecular basis which successfully explains its physical phenomena.
- Discuss, through examples, the impact of chemical phenomena on the fields of medicine, pharmacy, dentistry, biology, and physics.
- Explain the intermolecular attractive forces that determine the properties of the states of matter and phase behavior.
- Determine the rate of a reaction and its dependence on concentration, time, and temperature.
- Use Le Chatelier's Principle to predict the effects of concentration, pressure and temperature changes on equilibrium mixtures.
- Apply the principles of equilibrium to aqueous systems.
- Perform calculations with the thermodynamic functions, enthalpy, entropy, free energy.
- Follow experimental procedures.

- Write proper laboratory reports with abstract, introduction, experimental methods, results, discussion, conclusions, with appropriate graphs and statistical data analysis, including dimensional analysis.

CHEM142 Principles of Chemistry II (Majors) Fall 2023 TENTATIVE Course Schedule

Lecture #	Date	Topic	Reading	Homework	Laboratory Exercise
1	8/24	Solutions and Solubility	13.1 - 13.3	<i>Due date: name in pearsons</i>	
	8/28			HW 0 8/30: intro, practice, review (no credit)	Lab 1: Colligative Properties
2	8/29	Concentration	13.4		
3	8/31	Colligative Properties	13.5 - 13.6		
4	9/05	Reaction Rates	14.1 - 14.3	HW 1 9/05: ch 13-1,2	
5	9/07	Change of Concentration with Time, Temperature	14.4 - 14.5		
	9/11				Lab 2: Kinetics
6	9/12	Reaction Mechanisms	14.6 -14.7	HW 2 9/12: ch 14-1	
7	9/14	Chemical Equilibrium	15.1 - 15.2		
	9/19	Midterm 1 Ch 13-14		HW 3 9/17: ch 14-2	
8	9/21	Heterogeneous Equilibria	15.3 - 15.5		
	9/25				Lab 3: LeChâtelier's Principle
9	9/26	LeChâtelier's Principle	15.6 - 15.7	HW 4 9/26: ch 15-1	
10	9/28	Arrhenius and Brønsted-Lowry Acids Bases	16.1 - 16.4		
11	10/03	Strong and Weak Acids and Bases	16.5 - 16.8	HW 5 10/03: ch 15-2, 16-1	
12	10/05	Acid Base Behavior, Lewis Acids and Bases	16.9 - 16.11		
	10/9				Lab 4a: Acid Base Titrations
13	10/10	Common Ion Effect and Buffers	17.1 - 17.2	HW 6 10/10: ch 16-2,3	
14	10/12	Acid Base Titrations	17.3		
	10/16				Lab 4b: Acid Base Titrations
15	10/17	Solubility Equilibria	17.4 - 17.5	HW 7 10/17: ch 17-1	
16	10/24	Selective Precipitation, Qualitative Analysis	17.6 - 17.7	HW 8 10/24: ch 17-2,3	
17	10/26	Entropy and 2nd Law of Thermodynamics	19.1 - 19.2		
	10/30				Lab 5: Thermodynamics
	10/31	Midterm 2 Ch 15-17		HW 9 10/29: ch 17-4	
18	11/02	Entropy and 3rd Law of Thermodynamics	19.3 - 19.4		
19	11/07	Free Energy	19.5 - 19.7	HW 10 11/07: ch 19-1	
20	11/09	Oxidation and Reduction Reactions	20.1 - 20.3		
	11/13				Lab 6: Electrochemistry
21	11/14	Voltaic Cells, Cell Potentials and Equilibria	20.4 - 20.6	HW 11 11/14: ch19-2,20-1	

Lecture #	Date	Topic	Reading	Homework	Laboratory Exercise
22	11/16	Batteries, Corrosion and Electrolysis	20.7 - 20.9	HW 12 11/19: ch 20-2	
	11/20				Lab 7: Nanoparticle Synthesis
	11/21	Midterm 3 Ch 19,20			
23	11/28	Solids and Crystal Lattices, Metals	12.1 - 12.3	HW 13 11/30 TBD	
24	11/30	Ionic and Molecular Solids, Polymers	12.4 - 12.8		
25	12/05	Course Review		HW 14 12/06 TBD	
26	12/07	Exam Review			
	12/12	Final Exam 9:00-11:30 am			