

CHEMISTRY 106: FUNDAMENTAL CHEMISTRY

COURSE DESCRIPTION

Chemistry is the study of matter and the transformations of matter. Chemistry is not just chemicals. *Chemistry is at the heart of cooking*—how is cheese made? What makes bread rise? *Chemistry explains how things work*—what powers your cell phone? What illuminates your computer screen or TV? How can we use the sun's energy to create electricity and fuels? *Chemistry keeps you safe and informed*—what household chemicals can be safely mixed and which ones are dangerous to keep together? It gives you a basic understanding of product labels; *Chemistry keeps you healthy*—chemistry is medicine, vitamins and supplements. Chemistry is central to the world around you.

Chemistry 106 is intended to build on the topics introduced in Chemistry 105—the elementary theories and language of chemistry—provide students with essential analytical reasoning and problem-solving skills, and serve as the foundation to advanced chemistry and science courses. Topics covered in Chemistry 106 include an introduction to organic chemistry, chemical kinetics and equilibrium, thermodynamics, and electrochemistry. I hope that this class will not simply feel like another “requirement” course, but rather an eye-opening class to understanding the world around you and how chemistry is creating a better tomorrow.

LEARNING OUTCOMES

At the end of this course, a successful student will be able to:

- **Apply** chemistry ideas and language to describe and enhance your understanding of the physical phenomenon around you.
- **Solve** a variety of chemical problems utilizing analytical reasoning and problem-solving strategies.
- **Perform** important laboratory techniques and methods with a safety-conscious attitude.
- **Communicate** scientifically through written and oral means.

CLASS SESSIONS

	Section	Day(s)	Time	Location	Instructor
LECTURE	Sec 1	T, R, F	9:00	A121	Riha
DISCUSSION	Sec D1	T	11:00	A110	Riha
	Sec D2	T	12:00	A110	Riha
	Sec D3	T	2:00	A110	Riha
	Sec D4	T	3:00	A110	Riha
LAB	Sec L1	W	8:00	B140	Lawrence
	Sec L2	M	11:00	B140	Timerman
	Sec L3	W	11:00	B140	Lueck
	Sec L4	R	2:00	B140	Lueck

COURSE COMPONENTS

Lecture is designed to introduce you to the concepts that define chemistry. My lectures combine classic “chalk-talks” with videos, lecture supplements, clickers, real-world applications and live demonstrations to appeal to the variety of learning styles students have.

Discussion provides a more intimate and active learning environment. It is geared toward reinforcing material presented in lecture through small group activities. On occasion, I may use this time to address some of the more challenging concepts covered in lecture as I see fit.

Lab is the fun part! “Hands-on” experience is essential to learning chemistry. It gives you the experience of putting the key concepts you covered in lecture into practice, teaches you experimental techniques, and helps you better learn how to problem solve.

REQUIRED MATERIALS

➤ Course text

Chemistry: An Atoms-focused Approach, Gilbert, Kirss, Foster

- Available at text rental in the Campus Bookstore

➤ Laboratory manual

Chem 106 Lab, Spring 2018. Jonsson, Riha, Speetzen

- Available for purchase in the Campus Bookstore

➤ Laboratory notebook

Must have carbon(less)-copy pages.

- Available for purchase in the Campus Bookstore (or reuse from CHEM105)

➤ Calculator

Any non-programmable calculator that can do logarithms and exponentials.

- Available for purchase in the Campus Bookstore or at any office supply store

➤ Sapling

On-line activity homework system.

- Go to www.saplinglearning.com/login to log in or create an account. The following link includes detailed instructions on how to register for the course: <https://community.macmillan.com/docs/DOC-5972-sapling-learning-registering-for-courses>
- If you have any issues during sign up or throughout the semester, the technical support team is there to help. They can be reached by phone or by webform via the Student Support Community. (<https://community.macmillan.com/docs/DOC-6915-students-still-need-help>)

ASSESSMENT

Your progress in this course will be assessed based on both in-class and lab performance.

Exams. A cumulative midterm exam will be given midway into the semester during the scheduled evening exam period. A cumulative final exam will be given at the end of semester. Midterm and final exam dates are found in the Lecture Schedule and will not change.

Quizzes. Quizzes will be given every third week (4 total) during the lecture period. Material on quizzes will include that covered in lecture, assigned and suggested homework problems, and discussion worksheets. The dates for quizzes can be found in the Lecture Schedule below and will not change.

Lab Reports. Lab is the “hands-on” experience essential to learning chemistry and critical to your success in this course. During lab, each student will be responsible for properly keeping a lab notebook and collecting data to complete the experiment. Lab reports will be due at the beginning of the following lecture period.

Homework. Assigned homework sets (10 total) will be administered through Sapling, an on-line homework system. The on-line homework system is designed to provide you, the student, immediate feedback as well as useful hints and suggestions to solve problems. Tentative due dates are listed in the Lecture Schedule.

GRADING

The grade you receive for the course will be based on the following:

Midterm Exam	100
Quizzes (50 pts each)	200
Homework (10 pts each)	100
Lab Reports (Top 12 at 10 pts each)	120
Syllabus Quiz	5
Final Exam	200

TOTAL **725**

Tentative grading scale cut-offs:

A	100 – 93%	The cut-off percentages may be adjusted at the end of the semester; however, I will never adjust the cut-off percentages higher. This means if you get an 83% you will not receive any lower than a B for the final grade.
A-	<93 – 90%	
B+	<90 – 87%	
B	<87 – 83%	
B-	<83 – 80%	
C+	<80 – 77%	
C	<77 – 73%	
C-	<73 – 70%	
D+	<70 – 66%	
D	<66 – 60%	
F	<60%	

Note: Receiving less than 60% (<72 points) for the Lab portion will result in a failing grade for the course regardless of total points earned.

HELP & RESOURCES

If you are feeling lost or overwhelmed, there are many resources to get help in this class to maximize your learning experience. Seek help early and often!

- **Come see me.** I am dedicated to help you learn. I have regularly scheduled office hours (see My Schedule below) but if my door is open, come on in! You can also e-mail me to set up an appointment.
- **Use SI through the TLC.** Noah Langenfeld, a biology and biochemistry double major, will be heading the supplemental instruction (SI) sessions for this Chem 106 section. SI fosters peer-to-peer collaborative learning techniques through structured group study sessions. This is a FREE service available to ALL students. More information regarding times and locations will be announced in class during the first few weeks.
- **Form study groups.** Working with other students in the course is a great way to build off each other’s strengths and see how to approach problems in different ways.
- **D2L.** Course information, including suggested problem sets, learning objectives, lecture slides, discussion materials, and exam/quiz material will be posted on this site. You can also find a running total of your points for the course.
- **Chapter Learning Objectives.** Learning objectives help you, the student, comprehend what I expect you to learn as we finish each chapter and will serve as an excellent study guide for the quizzes and exams. Creating your own study guide will help you transition into understanding and organizing complex subject matter.

ADVICE FOR A SUCCEEDING IN THIS CLASS

This class is fast-paced and to do well will require you to put forth a constant effort.

- **Scan topics to be covered in class ahead of time.** Don’t feel you need to learn and understand everything right away. Rather, skim over each chapter section before they are

covered in lecture. You will be much more prepared to learn new material by having an idea of what is ahead.

- **Work the suggested practice problems.** I cannot stress this point enough! Chemistry is not a course that can simply be memorized right before the exam. Chemistry is a complex subject and can seem, at times, very overwhelming. Working through suggested problems will not only help you understand and retain the material better, it will also prepare you for questions that may appear on exams.
- **Take notes.** Taking notes in lecture not only keeps you informed on what was covered that day but also provides you with what I feel are the most important materials. This will also help you know what material is most likely to make it on an exam.
- **Read the topics carefully.** After covering the material in lecture, go back and read through the key topics. Look over the sample exercises to make sure you understand the key concepts. Then test your skills by trying some of the suggested practice exercises. You will find that the answers to most of the suggested problem sets are found in the back so you can check your progress.
- **Ask questions.** No question is a dumb question. If you are struggling with material or are just curious about something, don't hesitate to ask. Chances are there is someone else in the room with the same question.
- **Don't fall behind.** The materials presented in this course build on what was presented previously. Therefore, if you do not keep up with your reading and problem sets you will find it much harder to follow the lectures and discussions on current topics.

INSTRUCTOR INFORMATION

Office: Science Building D140

Phone: 715-346-2172 (on campus dial x2172)

E-mail: sriha@uwsp.edu

**Email is the preferred way to reach me.

My Spring 2017 Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00	R, P, G	Prep	R, P, G	Prep	Prep
9:00		Lect 1 (A121)		Lect 1 (A121)	Lect 1 (A121)
10:00		R, P, G	Office Hour	Office Hour	R, P, G
11:00		Disc 1 (A110)	R, P, G		
12:00		Disc 2 (A110)			
13:00		R, P, G		R, P, G	Department meetings and seminars
14:00		Disc 3 (A110)	Lab (CHEM248)		
15:00		Disc 4 (A110)			
16:00	Lab (CHEM248)	Office Hour			

Office Hours are also available by appointment.

How Am I Doing? If there are any particular aspects of my instructing that you find helpful or not useful, please let me know. I can only perform my job as your instructor effectively if I get *constructive* feedback from you, the student.

THE FINE PRINT

- **Attendance, Absences and Make-ups**
 - Chemistry is a very exciting, yet challenging and complex course. It is, therefore, essential to attend all course lectures, discussions and labs to achieve

the course learning objectives. If you miss a lecture it is your responsibility to obtain the material covered. Any unexcused absence from a lab or exam will not be tolerated and you will receive zero points for that lab or exam. **Make-up labs or exams for unexcused absences will NOT be given.**

- **Excused Absences.** An excused absence from a lab, quiz, or exam must be presented in writing (preferably ahead of time). Make-up quizzes/exams and labs will be scheduled under the following circumstances: UWSP scheduled athletic event (written authorization from coach), family emergency (documentation such as an obituary), medical emergency (written authorization from physician), armed forces training/drills (written authorization from supervising officer), or the like.
- **Etiquette.** Be respectful of your fellow classmates!
 - Whispering and talking to your neighbor during class is disruptive and annoying to those around you trying to listen to the lecture. If there is something you do not understand or have a question about, please raise your hand. If you are uncomfortable asking the question in front of the class, you can e-mail me, talk to me after class, or see me during office hours.
 - Cell phones must be turned off and put away during class. This means no texting/tweeting/social networking during class.
 - No iPods, radios, MP3 players or other recording and transmitting devices may be used during quizzes or exams. Hats with bills must be turned backwards during an exam.
 - It is your responsibility to check D2L for the points you have earned in the class. If you find that an error has been made, you must inform me within *one week* of the posting grade for it to be considered.
 - Mocking/teasing others in the class will not be tolerated.
- **Academic Misconduct.** As stated in the Student Academic Standards and Disciplinary Procedures:

“The Board of Regents, administrators, faculty, academic staff and students of the University of Wisconsin System believe that academic honesty and integrity are fundamental to the mission of higher education and of the university of Wisconsin system. The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty.”

Therefore, students caught cheating on quizzes/exams or in the laboratory are subject to a grade of F for the course and a report being placed in their judicial file. More information can be found at: <http://www.uwsp.edu/dos/Pages/Academic-Misconduct.aspx>
- **Disability Services.** There are a number of resources available for students with documented disabilities. A full listing of them can be found at <http://www.uwsp.edu/special/disability/>. Please be aware that, in order to take advantage of some of the services, you must provide me with an Accommodation Request Form I will sign. You must return the form to Disability Services.

SCHEDULES

Tentative Lecture Schedule

- Please note that this is a *tentative* schedule and may be adjusted depending on the pace of the class. The quiz/exam dates, however, will not change.

Week	Topic	Reading	Important Dates
1	Syllabus/Review/Gases	Ch. 10	
2	Gases/IMF & liquids review	Ch. 10	January 28: HW 0 due
3	Properties of Solutions	Ch. 11	February 4: HW 1 due

			February 8: Quiz 1
4	Solutions/Thermodynamics	Ch. 11/12	
5	Thermodynamics/Kinetics	Ch. 12/13	February 18: HW 2 due
6	Kinetics	Ch. 13	February 25: HW 3 due March 1: Quiz 2
7	Kinetics	Ch. 13	
8	Chemical Equilibrium	Ch. 14	March 11: HW 4 due March 15: Midterm 6-8pm
9	Chemical Equilibrium	Ch. 14	
	Spring Break!		
10	Aqueous Equilibria	Ch. 15	April 1: HW 5 due
11	Aqueous Equilibria	Ch. 15	
12	Aqueous Equilibria	Ch. 15	April 15: HW 6 due April 19: Quiz 3
13	Electrochemistry	Ch. 17	
14	Electrochemistry/Solids	Ch. 17/18	April 29: HW 7 due May 3: Quiz 4
15	Solids/Review	Ch. 18	May 6: HW 8 due
16	Final Exam		May 13: HW 9 due May 16: 12:30-2:30 pm

Lab Schedule

Week	Date	Experiment
1	1/22	Safety and Check In
2	1/29	Experiment 1: Synthesis of Aspirin
3	2/5	Experiment 2: Analysis of Aspirin
4	2/12	Experiment 3: Molar Mass of a Metal by Gas Evolution
5	2/19	Experiment 4: Lattice Enthalpy, Hydration Enthalpy, and Heats of Solution
6	2/26	Experiment 5: Freezing Point Depression
7	3/5	Experiment 6: Iodine Clock
8	3/12	Experiment 7: Decomposition of Crystal Violet
9	3/19	Experiment 8: Determination of an Equilibrium Constant
	3/26	**SPRING BREAK—No Labs**
10	4/2	Experiment 9: LeChatlier's Principle
11	4/9	Experiment 10: Thermodynamics of KNO_3 Dissolution
12	4/16	Experiment 11a: Strong vs. Weak Acid Analysis (Part I)
13	4/23	Experiment 11b: Strong vs. Weak Acid Analysis (Part II)
14	4/30	Experiment 12: Buffers
15	5/7	Experiment 13: Electrochemical Cells & Check Out

*****Goggles, close-toed shoes, and long pants are required for entry into the lab*****