

## CHEMISTRY 105: 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 105* is intended to introduce the elementary theories and language of chemistry, provide the student with essential analytical reasoning and problem solving skills, and serve as the foundation to advanced chemistry and science courses. Topics covered in this class include: 1) matter and measurements in chemistry, 2) atomic and molecular structure, 3) chemical bonding, 4) chemical reactions and stoichiometry, and 5) thermochemistry. 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 3	M, W, F	12:00	D101	Riha
DISCUSSION	Sec 11	M	2:00	A112	Riha
	Sec 12	M	3:00	A112	Riha
	Sec 13	T	11:00	A112	Riha
	Sec 14	T	12:00	A112	Riha
	Sec 15	T	2:00	A112	Riha
	Sec 16	T	3:00	A112	Riha
LAB	Sec 11	T	8:00	B140	Lemke
	Sec 12	W	8:00	B140	Riha
	Sec 13	R	8:00	B140	Lawrence
	Sec 14	F	8:00	B140	Lemke
	Sec 15	M	2:00	C124	Timerman
	Sec 16	W	2:00	B140	Lemke

## 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 105 Lab, Fall 2016*. Jonsson, Riha, Snyder, Speetzen

- Available for purchase in the Campus Bookstore

### ➤ Laboratory notebook

Must have carbon(less)-copy pages.

- Available for purchase in the Campus Bookstore

### ➤ Calculator

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

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

### ➤ Clicker

Your clicker may be used in any class that requires clickers for the semester.

- Available through UWSP’s Help Desk, located in the basement of UWSP Library, room 027 LRC. **You will need your UWSP student ID to lease a clicker.** The \$8 lease fee will automatically be added to your UWSP student bill.

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

**Lab.** During the lab period you will work with a partner to complete the experiment and post lab questions. However, each student will be responsible for properly keeping a lab notebook throughout the course of the semester. The lab practical will assess your ability to apply what you learned in previous experiments. You will work alone and will be given very little instruction. You will, however, be able to use your lab notebook on the lab practical.

**Clickers.** Clickers allow everyone to participate in a low-pressure, pseudo-anonymous environment. *Reading clickers* will assess your preparation for lecture based on assigned reading and will be given at the beginning of lecture. To encourage active participation during the lecture, additional Clicker questions will be ½ point each, allowing up to **20 extra credit points** over the course of the semester.

## GRADING

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

Midterm exam	100
Quizzes (50 pts each)	200
Lab Reports (11 at 10 pts each)	110
Lab Practical	60
Reading Clickers	40
Syllabus Quiz	5
Final Exam	200
<b>TOTAL</b>	<b>715</b>

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:** You are required to pass both lecture and lab. Receiving less than 60% for either the Lecture or the Lab portion (<327 points for lecture or <102 points for lab) 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 TIMS at UWSP.** Michelle Kienow, a prior student of mine who has successfully mastered the course material, will be heading the group tutoring session for this Chem 105 section. The small group setting helps students better understand the material and engage with other students. Group tutoring is a FREE service available to ALL students. Links to group tutoring schedules can be found on D2L.
- **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 notes, and discussion materials, 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. Jot down key terms or equations cover as well as any questions you have about the material. You will be much more prepared to learn new material by having an idea of what is ahead.
- **Work the suggested 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 quizzes and 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 or quiz.
- **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 by taking the Concept Tests. Then test your skills by trying some of the suggested end of chapter 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

### Contact 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 Fall 2016 Schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00	R, P, G		Lab 16 (B140)		R, P, G
9:00		R, P, G			
10:00	Office Hour				Office Hour
11:00	Prep	Disc 13 (A112)	Prep		Prep
12:00	Lect 3 (D101)	Disc 14 (A112)	Lect 3 (D101)	R, P, G	Lect 3 (D101)
13:00	R, P, G	R, P, G	Office Hour		
14:00	Disc 11 (A112)	Disc 15 (A112)			Department meetings and seminars
15:00	Disc 12 (A112)	Disc 16 (A112)	R, P, G		
16:00	R,P,G	R, P, G			

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, quizzes or exams for unexcused absences will NOT be given.***
  - **Excused Absences.** An excused absence from a lab 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 or talk to me during office hours.
  - Cell phones must be turned off and put away during class. This means no texting during class.
  - No iPods, radios, MP3 players or other recording and transmitting devices may be used during an exam or quiz. Hats with bills must be turned backwards during an exam or quiz.
  - 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 exams, quizzes 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 exam dates, however, will not change.

Week	Topic	Reading	Quizzes and Exams
1	Matter, Energy, and Measurement	Ch. 1	
2	Matter, Energy, and Measurement Atoms, Ions, and Molecules	Ch. 1 Ch. 2	
3	Atoms, Ions, and Molecules	Ch. 2	Sept. 19: Quiz 1
4	Electronic Structure of Atoms	Ch. 3	
5	Electronic Structure of Atoms Chemical Bonding	Ch. 3 Ch. 4	
6	Chemical Bonding	Ch. 4	Oct. 10: Quiz 2

7	Molecular Geometry and Bonding Theories	Ch. 5	Lab Practical
8	Molecular Geometry and Bonding Theories Intermolecular Forces	Ch. 5 Ch. 6	
9	Stoichiometry	Ch. 7	<b>Oct. 31: Midterm</b>
10	Stoichiometry	Ch. 7	
11	Reactions in Aqueous Solutions	Ch. 8	
12	Reactions in Aqueous Solutions	Ch. 8	Nov. 21: Quiz 3
13	Thermochemistry	Ch. 9	
14	Thermochemistry	Ch. 9	
15	Review and Catch-up		Dec. 12: Quiz 4
16	Finals Week		<b>Final Exam: Dec. 20, 2:45 – 4:45</b>

### Lab Schedule

Week	Date	Experiment
1	9/5*	Safety and Check in
2	9/12	<b>Experiment 1:</b> Precision vs. Accuracy in Scientific Measurements and Calculations
3	9/19	<b>Experiment 2:</b> Water Content of a Hydrated Salt
4	9/26	<b>Experiment 3:</b> Introduction to Absorption Spectroscopy
5	10/3	<b>Experiment 4:</b> Colorimetric Determination of Iron
6	10/10	<b>Experiment 5:</b> Periodic Properties
7	10/17	<b>Experiment 6:</b> Lab Practical
8	10/24	<b>Experiment 7:</b> Polarity
9	10/31	<b>Experiment 8:</b> Intermolecular Forces
10	11/7	<b>Experiment 9:</b> Stoichiometric Analysis of Antacid Tablets
11	11/14	<b>Experiment 10:</b> Copper Transformations
12	11/21	No Labs this week — Thanksgiving Holiday!
13	11/28	<b>Experiment 11:</b> Introduction to Titrations: KHP Titration
14	12/5	<b>Experiment 12:</b> Vinegar—Is the Label Truthful
15	12/12**	Check out
16	12/19	No Lab

\*Monday labs will check in and perform Experiment 1 on 9/12

\*\* Friday labs will check out on 12/9

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