

	Monday	Tuesday	Wednesday	Thursday	Friday
08:00	105 Lab 01L1 CBB 230 Hladky	105 Lec 01 CBB 105	PRAG	105 Lec 01 CBB 105	105 Lec 01 CBB 105
09:00	105 Lab 01L1 CBB 230	Prep	PRAG	Prep	Prep
10:00	105 Lab 01L1 CBB 230	333 Lec 01 CBB 131	PRAG	333 Lec 01 CBB 131	333 Lec 01 CBB 131
11:00	PRAG 105 Lab 01L2 CBB 230 Timerman	Prep	PRAG	PRAG	PRAG
12:00	PRAG 105 Lab 01L2 CBB 230	105 Dis 01D1 CBB 265	PRAG	PRAG	PRAG
13:00	PRAG 105 Lab 01L2 CBB 230	Prep	PRAG	PRAG	PRAG
14:00	PRAG 105 Lab 01L3 CBB 230 Lemke	105 Dis 01D2 CBB 265	PRAG 105 Lab 01L4 CBB 230 Tanke	PRAG	PRAG
15:00	PRAG 105 Lab 01L3 CBB 230	105 Dis 01D3 CBB 265	PRAG 105 Lab 01L4 CBB 230	PRAG	PRAG
16:00	PRAG 105 Lab 01L3 CBB 230	105 Dis 01D4 CBB 265	PRAG 105 Lab 01L4 CBB 230	PRAG	PRAG

PRAG = Projects, Research, Appointments or Grading

I. Course Descriptions (CHEM 105 & CHEM 106)

CHEM 105 - Fundamental Chemistry (5 cr)

Description:

(Two semester basic course) Fundamental principles and theories of chemistry, including stoichiometry, atomic and molecular structure and bonding, nuclear chemistry, thermodynamics, descriptive chemistry of nonmetals and transition metals, chemical kinetics and equilibria, introduction to organic chemistry.

Prerequisites:

High school chemistry or [CHEM 101](#) recommended; con reg in [MATH 107](#) or suitable math placement test score. (See [notes 3 and 4](#))

CHEM 106 - Fundamental Chemistry (5 cr)

Description:

Continuation of [CHEM 105](#) .

Prerequisites:

[CHEM 105](#) with a grade of C- or better, and completion of [MATH 107](#) or suitable math placement test score. (See [note 4](#) .)

II. Course Objectives

General Education Program (GEP)

As the progress of our society becomes more dependent on science and technology, our future becomes increasingly dependent upon a scientifically literate population. Individuals today must be sufficiently knowledgeable about scientific facts, science applications, and the process of scientific inquiry in order to make reasoned decisions concerning their use in addressing society's problems. Courses in this area must contain a laboratory component to help you develop an understanding of scientific inquiry. Upon completing this requirement, you will be able to:

- Interpret information, solve problems, and make decisions by applying natural science concepts, methods, and quantitative techniques.
- Explain major concepts, methods, or theories used in the natural sciences to investigate the physical world.
- Describe the relevance of some aspect of the natural sciences to their lives and society.

Student Learning Outcomes (Chemistry Department)

Students completing Chem 105 will perform tasks, at an introductory level, representing the five underlined learning outcomes. Students graduating with a major in Chemistry from the University of Wisconsin-Stevens Point will be able to perform tasks representing all eight of the following learning outcomes.

- apply the foundational principles of chemistry (conservation of matter, the laws of thermodynamics, the principles of phenomenological and mechanistic kinetics, and models for the electronic structure of atoms and molecules) to explain the chemical and physical properties of matter.
- work safely in a chemistry laboratory.
- use appropriate methods, techniques, and equipment and modern instruments for the synthesis, isolation, and characterization of matter and for the analysis of mixtures. Graduates will be able to explain the operating principles and interpret the output of instruments.
- search the chemical literature for information relevant to a project of interest utilizing modern methods.
- document experimental results in a laboratory notebook according to accepted scientific standards.
- communicate experimental results and chemistry related issues as a written report, as a poster, and as an oral presentation. Students will be able to work in teams to perform laboratory work and report on this work.
- analyze experimental results to draw justifiable conclusions.
- address chemical problems using their accumulated knowledge and skills in combination with scientific methodology to design and conduct experiments.

III. Course Schedule

Week	Lecture Days			Lab Exercises
	Text Chapters and Exams			Lecture-related activities and omitted textbook sections
	Tue	Thur	Fri	
1	Intro / 1	1	1	Check-in
2	1 / 2	2	2	Precision vs Accuracy in Scientific Meas & Calcs omit sections 2.6 and 2.7
3	2 / 3	3	3	Water Content of a Hydrated Salt
4	3	3	4	Introduction to Absorption Spectrophotometry
5	4	Ex 1	4	Colorimetric Determination of Iron Exam 1 covers chps 1,2,3 and Nomenclature of Ionic and Molecular Compounds (see handout and textbook section 4.2)
6	4	4	5	Periodic Properties omit section 5.7
7	5	5	5	Molecular Models
8	6	6	6	Spectrophotometric Analysis for Iron in Cereal omit section 6.5
9	7	Ex 2	7	Intermolecular Forces Exam 2 covers chps 4,5,6
10	7	7	7	Separation of a Mixture omit section 7.7
11	7	8	8	Limiting Reactant
12	8	---	---	Thanksgiving - No Lab
13	8	8	8 / 9	Titration - Standardization of KHP
14	9	Ex 3	9	Titration of Vinegar - Is the label Truthful? Exam 3 covers chapters 7 and 8
15	9	9	Lab Fnl	Check-out from lab Lab final (given during lecture) covers weeks 1 - 13
16	---	---	---	Lecture Final Exam - Monday 12/18/2017 Lecture Final Exam covers chapters 1 - 9

Class Attendance: Attendance for all lectures, discussions and laboratories is expected as outlined in the UWSP Undergraduate Catalog. See the section about Attendance under Academic Policies.

UWSP is committed to providing reasonable and appropriate accommodations to students with disabilities and temporary impairments. If you have a disability or acquire a condition during the semester where you need assistance, please contact the Disability and Assistive Technology Center (DATC) on the 6th floor of Albertson Hall (library) as soon as possible. For DATC contact information, see www.uwsp.edu/datc/Pages/default.aspx

IV. Principle Assignments

Assignment	Graded (Y / N)	Notes
Concept Tests	N	a learning aid located in most textbook sections
Sample Exercises	N	a learning aid located in many textbook sections
Practice Exercises	N	a learning aid located in many textbook sections
Visual Problems (vp)	N	a learning aid located at the end of each chapter see list of recommended vp below
Questions and Problems (q&p)	N	a learning aid located at the end of each chapter see list of recommended q&p below
Supplemental Problems	N	a learning aid provided for select chapters
Online Homework	Y	login to Sapling website using directions and links supplied in an email.
Lecture Exams	Y	see schedule in syllabus for more information
Lab Notebook	Y	See pages 1-7 and 2-4 for the prelab assignment. The grading rubric is shown below. Note that it is worth zero points if all items are done but there are 0.25 pt deductions for each item that is not done.
Lab Reports	Y	The structure of lab reports will be discussed in the first discussion period.
Lab Final	Y	see schedule. A review session will be held during the discussion period preceding the exam.
Lecture Final	Y	comprehensive exam focusing on the main topics of the semester

Chp	End-of-chapter: Suggested Visual Problems and Suggested Questions & Problems
1	1a, 3, 9, 11, 19, 21, 27, 29, 41, 49, 51, 53, 59, 65, 67, 69, 71, 77, 86
2	5, 9, 21, 23, 25, 31, 33, 35, 41, 43, 45, 49, 51, 53, 55, 59, 61, 63, 65 (calculate moles only), 67, 69, 71 (a & d), 73a, 75, 77, 81 Remember that sections 2.6 and 2.7 are omitted at this time. They will not be on the first exam.
3	1, 7, 10 (answers given below), 17, 19 (a, d), 73, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103 75 reworded. How many orbitals are in the shell with the following principal quantum numbers (a) 1, (b) 2, (c) 3. The textbook answers are correct. 10) (a) emission, (b) A is least energy, lowest frequency, longest wavelength; B is intermediate energy, intermediate frequency, intermediate wavelength; C is greatest energy, highest frequency, shortest wavelength.
4	1, 3, 5, 19, 31, 35, 37 (a, c, d), 39 (a, b), 41, 43, 47, 49 (a, e), 51 (a, c, d, e), 53, 65, 67, 69, 71 (a, d), 73, 85, 87, 105, 109 (The chemical formula shows the atoms in the correct order), 117, 129, 133, 139, 141
5	13, 19, 21, 23, 25, 27, 29, 31, 43, 47 a, 53, 57, 71, 83, 85 (aspartame only), 87, 109
6	13, 17, 18 (answer below), 24 (answer below), 27, 35 (a,b), 39 18) Water molecules tend to be oriented so that the oxygen atoms (slightly negative part of dipole) are near the positively charged cations. 24) Br ₂ is nonpolar only London dispersion forces (LDF) present. ICl is polar so it has dipole-dipole interactions in addition to LDF.
7	7, 8 (answer below), 19, 21 (a, c), 23, 27, 29, 33, 35, 37, 47, 55, 57, 69, 81, 85 8) 4.00 g of B consumed
8	11, 13, 15, 19, 23, 29, 39 (hint - total conc. of ions), 43, 45, 47, 49, 51, 53, 57, 59, 63, 65, 67, 69, 77, 83, 85, 89, 91 (CO ₂ is also a product), 93 (H ⁺ and H ₂ O are also products), 101
9	25 (a), 27, 65, 69, 71, 73, 83, 85, 91, 95

Suggestions For Studying / Learning:

The main principles to remember for studying are that (a) you should learn something new every day, (b) your understanding of chemistry will be measured using exams, and (c) you work alone on exams. In other words, during exams you won't get any help from the instructor, a tutor, another student, or any of your friends. You also will not have access to your notes, sample problems in the textbook, nor Google for help. To put this in a different light, your studying should involve a transition from getting help with problems to doing them completely by yourself. The following suggestions / hints may be helpful.

- 1) Skim each chapter before you start reading. The section headings and bold-type words should give you a sense of the chapter's material. I strongly recommend that you do this before I start the chapter in lecture.
- 2) Attend the lectures. I will follow the authors' order of topics fairly closely so my presentation of the material should complement the textbook. I will also relate the material that I am presenting to past and future topics. **I don't expect you to learn the material during lecture.** Instead, lectures are where you prepare to learn by hearing presentations about the course material and watching me solve sample problems. Lectures also set the pace of the course. Note the professors' rule of thumb - students should spend two to four hours working outside of class for every hour spent in class. Translation - most of your learning occurs outside of the classroom.
- 3) Take notes during lecture but don't try to write down every word. I use the white board rather than PowerPoint Slides so that you can write down everything I put in the board. You may want to flesh out your lecture notes when you read the textbook.
- 4) Read the textbook but don't try to read it all at once. The lectures set the pace and you should read the relevant sections before the next class period. Check your initial understanding of sections with the Concept Tests. Remember that part of your education is to become literate at the college/university level and that means you must be able to read college-level textbooks.
- 5) Take notes when you read but keep them to a minimum. For example, write down, or sketch, as appropriate:
 - a) section and subsection headings and a brief description,
 - b) terms in bold, italicized or underlined type and along with brief definitions,
 - c) important figures, tables and diagrams,
 - d) important equations, the meaning of each term and the units that appear in it,
 - e) a functional summary of the example problems in each section.Taking these notes yourself is much more important than reading notes taken by another person.
- 6) Work problems, work problems, work problems, ... and then work more problems.
 - a) Study the Sample Exercises and work the Practice Exercises that appear in the sections. You may peek at the book or your notes but try to get your own answer before looking at the authors' answer.
 - b) Work the recommended Visual Problems and End-Of-Chapter Questions and Problems as soon as you finish reading the relevant section. For your convenience, answers to the **boldface** problems are provided at the back of the book. Try to not peek at your notes, textbook, or the authors' answers until you have an answer to check. Remember that you can't peek when you take exams.
 - c) Working a few problems every day or two is much more valuable than trying to do them all in one marathon session the day before an exam.
 - e) Don't spend more than 5 minutes trying to start a problem.
 - f) It may be helpful to rework a selection of problems as you study for an exam but don't work the same problem over and over and over again.
 - g) If you spend 30 minutes on problems and you haven't worked any of them correctly, then you have wasted at least 20 minutes of your time. Wasted time does not count as study time.
- 7) Attend discussion sections. I will pose a variety of problems based on material from previous lectures, give you some time to work on them individually, and then provide the solutions. You can also ask questions about assigned problems.
- 8) If you are really stuck on a problem ask other students, talk to me after class, or come and see me during an office hour.

The textbook authors provide a summary and a problem-solving summary and at the end of each chapter which should be helpful when reviewing for exams. Remember that studying for an exam should be reviewing what you have already learned. One important part of reviewing is reworking previous problems a second time.

V. Evaluation

ITEM	Raw Pts Possible	Course Pts
Lab Notebooks & Reports (8 pts per lab, best 10 out of 12 lab scores)	80	80
Lab Final Exam (written exam)	50	50
Midterm Exams (100 pts / Exam) See item 2 below for more information about midterm exams.	300	300
Online Homework (ten assignments, each assignment worth 2 course points)	variable	20
Final Exam, Lecture (cumulative)	150	150
	----	600

Notes and Policies:

- All exams will be closed notes and closed book. They will be given only on the date listed in the lecture schedule. Information sheets will be provided when appropriate and will contain important equations, conversion factors and other information that may be needed.
- Missed midterm exams. No early exams are given.
 - Excused Absence (note from a health provider, coach, employer, ... that documents your reason for missing the exam and provides contact information for follow up verification). Contact the instructor to schedule a makeup exam.
 - Unexcused Absence (no note from a third party). Your first missed exam score will be replaced with the percentage of your final exam score. Additional unexcused absences result in zeros for exam scores.
- You must attend your scheduled lab session. Most of the experiments have prelaboratory exercises associated with them. These prelabs must be handed in at the beginning of each laboratory period.
- Missed laboratory session. There are no makeup lab sessions for any reason and you can't do a lab at a different time. Instead of makeup labs, I will count your best 10 out of 12 lab scores.
- A scientific calculator is required for this course, it may be used on exams and you are expected to know how to operate it. There will be no sharing of calculators without the instructors permission. **Cell phones may not be used as calculators.**
- Course grades will be assigned as follows: 100%-90.0%, A or A-; 89.9%-80.0%, B+, B or B-; 79.9%-70.0%, C+, C or C-; 69.9%-60.0%, D+ or D; Below 59.9%, F. I reserve the right to "curve" the final grades, but in no case will the curve result in requiring more than the above percentages for any grade.
- There are no individualized extra credit opportunities. If I offer an extra credit opportunity, it will be available to everyone in the class. For example, each hour exam has extra points and the final exam has extra points.
- If you believe that you need additional time for exams, then you must make arrangements with Student Disability Services. I have always honored their recommendations and requests.

These policies are meant to cover all absences (illness, university events, sports, family emergencies, ...) whether they are planned or unplanned. If you believe that you have extenuating circumstances that are not covered by these policies, then please see me as soon as possible. If you are not satisfied with my decision, you may take your case to the Dean of Students.

Academic Responsibility: You are encouraged to study together, work problems and exercises with others in the class, and to seek help in understanding the material. However, unless specifically instructed otherwise, all work to be graded should be your own work, and not copied from any other person. Any instances of plagiarism or cheating will be dealt with in accordance with the UWSP Chapter 14 rules on Academic Misconduct.

VI. Bibliography & Miscellaneous Requirements

- Text: Gilbert, T. R.; Kirss, R. V.; Foster, N. *Chemistry - an atoms-focused approach*; W. W. Norton & Company: New York, 2014.
- Goggles: Students must purchase goggles from the UWSP Bookstore. Students must get approval from the instructor if they have goggles from a different source.
- Calculator: A scientific calculator (graphing calculator is allowed). **Calculator Apps on cell phones are not acceptable during exams.**

Appendix - Laboratory Schedule and Lab Notebook Grading Rubric

Week	Points	Individual or Pairs	Title
1	---	I	Check-in
2	8	I	Precision vs Accuracy in Scientific Meas & Calcs
3	8	I	Water Content of a Hydrated Salt
4	8	P	Introduction to Absorption Spectrophotometry
5	8	I	Colorimetric Determination of Iron
6	8	I	Periodic Properties
7	8	P	Molecular Models
8	8	I	Spectrophotometric Analysis for Iron in a Cereal
9	8	P	Intermolecular Forces
10	8	I	Separation of a Mixture
11	8	I	Limiting Reactant
12	---	---	Thanksgiving - No Lab
13	8	I	Titration - Standardization of KHP
14	8	I	Titration of Vinegar - Is the label Truthful?
15	---	I	Check-out

CHEM 105 Lab Notebook Grading Rubric Name: _____

Experiment: _____ Section: _____

Item	√
<i>To be Completed by the Lab Instructor (pre-lab):</i>	
Updated table of contents	
Experiment title	
Experiment purpose	
Brief procedure or flow chart	
Data tables prepared in advance	
All entries made in ink	
<i>Lab Instructor Signature/initials:</i>	
<i>To be Completed by the Lab Grader (post-lab):</i>	
Date and signature present at the bottom of each page with data	
All data present in tables with titles, headings, and units	
Data errors appropriately labeled and corrected	
Results summary and/or conclusion	
Total Number of missing/incorrect Items	

Score on post lab questions	
Lab notebook deductions	
Overall Lab Score	

Notes: √ means item is present and correct.

0.25 pts will be deducted for each missing/incorrect item