Chemistry 105 - Fundamental Chemistry
Fall 2016
Dr. Erin Speetzen/Dr. Paul Hladky

While Dr. Speetzen is the instructor of record, she will be going on maternity leave on or before October 14th. Dr. Hladky will be taking over the lecture portion of the course during this time. Dr. Speetzen will be back on December 16th (the start of finals week).

Contact Information

Dr. Erin Speetzen

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Office Hours: Tuesdays 11 a.m. – noon
Wednesdays 11 a.m. – noon
Thursdays 2:00 – 3:00 p.m.
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Or email to set up an appointment

Dr. Paul Hladky

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Office Hours: Tuesdays 11 a.m. – noon
Tuesdays 11 a.m. – noon
or call 715-346-2888
to schedule an appointment

Meeting Times

Lecture: Tuesday, Thursday, Friday 8 – 8:50 p.m. Room A121

Lab/Discussion:

Section Number	Discussion (Room)	Lab (Room)	Lab Instructor (Office)
1	W 10 – 10:50 (A110)	M 11 – 1:50 (B140)	Mr. Gary Lueck (B147)
2	W 1 – 1:50 (A110)	T 11 – 1:50 (B140)	Mr. Gary Lueck (B147)
3	W 2 – 2:50 (A110)	R 11 – 1:50 (C124)	Dr. Jim Lawrence (D142)
4	W 3 – 3:50 (A110)	T 2– 4:50 (B140)	Dr. Erin Speetzen (B135)

Prerequisites

Math 90 or placement in 100 or above

Required Materials

Textbook

Chemistry – an Atoms-Focused Approach Gilbert, Kirss, and Foster, 1st Edition, Norton, *2014*. This book is available for rental at the University Bookstore.

Lab Manual

Chem. 105 Lab Manual – Fall 2016, UW-Stevens Point. This lab manual is available for purchase at the University Bookstore.

Lab Notebook These should be on the same shelf as the lab manual.

Course Description

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.

Course Objectives

Critical Thinking / Natural Science (Current General Degree Requirements)

(Adapted for Chem 105 from the University Handbook - Chapter 7, Section 6)

Purpose:

Courses meeting the Natural Science (NS) GDR expose students to scientific methods for evaluating evidence or information derived from the natural, physical world and the progression from hypothesis to experimentation to the development of theory. The goal of these courses is to provide to students a broad understanding of the pure sciences. Students will develop critical thinking skills, such as the ability to draw conclusions, infer relationships, solve problems and make predictions. NS courses will also provide an understanding of how science relates to individuals and/or society at large.

Guidelines:

1. Courses meeting the Natural Science component of GDR under the disciplinary domain of chemistry expose students to a scientific method for evaluating information (e.g., experimental data) with reference to knowledge of chemical composition and chemical transformations of matter, the structure-reactivity correlation and the role of chemicals in our everyday world.
2. NS courses provide students with the opportunity to draw logical conclusions, infer relationships, solve problems and make predictions based on an evaluation of evidence or scientific information that pertains to the natural, physical world.
3. NS courses give students an appreciation for how natural science (e.g., chemistry) is relevant to their lives and/or society.

Objectives:

1. Students will be able to use a scientific method to evaluate evidence or information that is pertinent to the course.
2. Students will be able to draw logical conclusions, infer relationships, solve problems, or use concepts of classification/categorization based on an evaluation of evidence or scientific information that is pertinent to chemistry.
3. Students will be able to describe the relevance of some aspect of chemistry to their lives and/or society.
4. Students will be able to demonstrate general knowledge of chemistry.
5. In addition to the four GDR Objectives, students in Chem 105 will develop and improve their laboratory skills.

New General Education Program (Starting Fall 2013)

Natural Sciences (Learning Outcomes)

(lab component also required)

- Identify the basic taxonomy and principles of the scientific method as it pertains to the natural, physical world.
- Infer relationships, make predictions and solve problems based on an analysis of evidence or scientific information.
- Apply scientific concepts, quantitative techniques and methods to solving problems and making decisions.
- Describe the relevance of some aspect of the natural science to their lives and society.

Student Learning Outcomes (Chemistry Department)

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. Students completing Chem 105 will perform tasks, at an introductory level, representing the five underlined learning outcomes.

(a) 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.

(b) work safely in a chemistry laboratory.

(c) 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.

(d) search the chemical literature for information relevant to a project of interest utilizing modern methods.

(e) document experimental results in a laboratory notebook according to accepted scientific standards.

(f) 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.

(g) analyze experimental results to draw justifiable conclusions.

(h) address chemical problems using their accumulated knowledge and skills in combination with scientific methodology to design and conduct experiments.

Recommended study habits and tips

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 receive your assignments and lectures 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. 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 will set the pace and you should try to read the relevant sections before the next class period. 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.
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.
    b) Work the suggested end-of-the-chapter exercises as soon as you finish reading the relevant section. You may ***peek*** at the book or your notes but try to get your own answer before looking at the authors' answer. For your convenience, answers to the odd-numbered problems are provided at the back of the book.
    c) Work the suggested additional exercises (end-of-chapter) and supplemental problems (handout) ***without peeking*** at anything. Remember that you can't peek when you take an exam.
    d) 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 material from the 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.

At the start of each chapter the authors provide you with a list of learning outcomes, each of which is paired with several end-of-chapter problems that you can use to test your knowledge. The authors also provide a chapter review at the end of each chapter. This review contains a section by section summary that includes key terms as well as a problem-solving summary that lists the kinds of problems you will encounter, the associated concepts and equations to solve these types of problems, and a set of sample exercises for you to try. These resources should be helpful when reviewing for exams.

Grading

Your grade in this course has two components, a laboratory component and a lecture component.

Laboratory component (150 points, 25% of class)
- 10 labs reports* (12 points each) — 120 pts total
  - *There will be 11 total labs, your lowest score will be dropped.
- Lab practical — 30 pts total

Lecture component (450 points, 75% of class)
- Three Midterm Exams (100 points/exam) — 300 pts total
- Final Exam (cumulative) — 150 pts total

Total Points in Class = 600 pts

******YOU MUST RECEIVE A PASSING GRADE IN <u>BOTH</u> THE LABORATORY COMPONENT <u>AND</u> THE LECTURE COMPONENT TO PASS THIS COURSE******

Your grade in the overall course will be determined by adding all the points you have earned in the laboratory component to those earned in the lecture component and using the grading scheme below:

A ≥ 93% A- ≥90%
B+ ≥ 87% B ≥ 83% B- ≥80%
C+ ≥ 77% C ≥ 73% C -≥ 70%
D+ ≥ 67% D ≥ 63%
F < 63%

Notes and Policies:

1. 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.
2. Missed or bombed midterm exams. No early nor makeup misterm exams are given. Instead, an optional exam **<u>and</u>** the percentage of your final exam score are also treated as midterm exam scores. The best three of these five scores are the three midterm exam scores used to calculate your final point total. Thus the optional exam and the final exam can be used as makeup exams or as a replacement for a bombed exam. In any case, the final exam score is always part of the final point total.
3. You must attend your scheduled lab session.
4. Missed laboratory session. There are no makeup lab sessions for any reason, however, I do drop your lowest lab so a single missed lab will not negatively impact your grade in the course. If you will be missing more than one lab you should talk to me immediately.
5. A non-graphing 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.
6. There are no individualized extra credit opportunities. If I offer an extra credit opportunity, it will be available to the entire class.
7. 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 cover *<u>all</u>*** absences. Since I can't reliably judge every student's absence to determine whether or not it is legitimate, these policies enable me to treat everyone equally and as fairly as possible. 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 the College of Letters and Science.**

Rights and Responsibilities

UWSP values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to success, we have developed a set of expectations for all students and instructors. This set of expectations is known as the *Rights and Responsibilities* documents, and it is intended to help establish a positive living and learning environment at UWSP. Click here for more information: http://www.uwsp.edu/stuaffairs/Pages/rightsandresponsibilities.aspx

Academic Misconduct

The definition of academic misconduct can be found at http://www.uwsp.edu/admin/stuaffairs/rights/rightsChap14.pdf
Students found to have engaged in academic misconduct on homework or labs will receive a score of zero on the assignment for the first offense and an F in the course for the second offense. Students found to have engaged in academic misconduct on an exam will receive a grade of F for the course.

Disability Services

The Americans with Diabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities. For more information about UWSP's policies, check here: http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/ADA/rightsADAPolicyInfo.pdf.

If you have a disability and require classroom or exam accommodation, please register with the Disabilities Services offer and then contact me. Complete information on the disability services offered at the university may be found at http://www.uwsp.edu/special/disability/

In order to receive accommodations you must have documentation of your disability on file with the Office of Disability Services. In addition, you must provide me with an Accommodations Request Form (available at the website). You must have me sign the form and return it to the Office of Disability Services.

Important Dates

Sept. 6	Classes Begin
Sept. 15	Last day to drop a 16 week course without a grade
Nov. 11	Last day to drop a 16 week course.
Nov. 23	Thanksgiving break begins at 6 p.m.
Dec. 15	Last day of class

Tentative Course Schedule

Week	**Lecture Days** Text Chapters and Exams			**Lab Exercise** Lecture Activities
	Tues	**Thurs**	**Fri**	
Week 1 9/6 – 9/9	1	1	1	**Check-in*** *Monday lab will check in during week 2
Week 2 9/12 – 9/16	2	2	3	**Precision vs Accuracy in Scientific Measurements and Calculations**
Week 3 9/19 – 9/23	3	3	3	**Water Content of a Hydrated Salt**
Week 4 9/26 – 10/1	3	3	4	**Introduction to Absorption Spectroscopy**
Week 5 10/3 – 10/7	Exam 1	4	4	**Colorimetric Determination of Iron** Exam 1 covers Ch 1 - 3
Week 6 10/10 – 10/14	4	4	5	**Periodic Properties**
Week 7 10/17 – 10/21	5	5	6	**Lab Practical** Skip section 5.7 (Molecular orbitals)
Week 8 10/24 – 10/28	6	7	Exam 2	**Polarity** Exam 2 covers Ch 4 - 6
Week 9 10/31 – 11/4	7	7	7	**Intermolecular Forces**
Week 10 11/7 – 11/11	7	8	Opt Ex	**Stoichiometric Analysis of Antacid Tablets** Optional Exam Covers Ch 1 - 7
Week 11 11/14 – 11/18	8	8	8	**Copper Transformations**
Week 12 11/21 – 11/25	8	No class	No class	**No Lab – Thanksgiving Break**
Week 13 11/28 – 12/2	8	8	9	**Introduction to Titrations: KHP Titration**
Week 14 12/5 – 12/9	Exam 3	9	9	**Vinegar – Is the Label Truthful** Exam 3 covers Ch 7 and 8
Week 15 12/12 – 12/15	Review	Review	No class	**Check Out**
Final Exam Tuesday December 20th 12:30 – 2:30 p.m.				

Class Attendance: Attendance for all lectures, discussions and laboratories is expected as outlined in the UWSP Undergraduate Catalog.