

**Lecture Time:** MWF 2:15-3:15  
**Place:** 201 Reichardt Building  
**Instructor:** Catherine F. Cahill  
**Office:** 182 Reichardt Building  
**Office Hours:** TR 3-5 and by appointment (call or email me)  
**Telephone:** 474-6905  
**E-mail:** [ffcfc@uaf.edu](mailto:ffcfc@uaf.edu)  
**Laboratory Director:** Emily Reiter (Office: 194A Reichardt; Tel: 474-6748;  
Email: [fnear@uaf.edu](mailto:fnear@uaf.edu))

**Required Materials:**

- (1) *Chemistry and Chemical Reactivity 7<sup>th</sup> Ed.*; Kotz, Treichel, and Townsend, Brooks/Cole; 2009 Volume 1 (ISBN 978-0-495-38711-4) or Complete text 7<sup>th</sup> Ed. (ISBN 978-0-495-38703-9) or e-book
- (2) OWL access card for *Chemistry and Chemical Reactivity 7<sup>th</sup> Ed* (1-semester or 2-semester)
- (3) Turning Technologies ResponseCard R<sub>F</sub> radio frequency clicker (new or used OK)
- (4) *Experiments in General Chemistry 105X: A Laboratory Manual* (Free! Pick up in lab.)
- (5) American Chemical Society (ACS) General Chemistry Study Guide
- (6) A non-programmable non-graphing scientific calculator is required for **each exam**.  
Note: The Department of Chemistry and Biochemistry does not provide calculators for exams. You must provide your own. Our advice is this: buy one now (cost ~\$10), learn how to use it, and then use it regularly to do chemistry homework. Do not wait until the day before the exam to obtain, and learn how to use, a non-programmable scientific calculator. Please do **not** bring a graphing and/or programmable calculator such as a TI-83 to Chem 105X exams.

**Optional Materials:**

*Chemistry & Chemical Reactivity - Student Solutions Manual.* Kotz  
*Chemistry & Chemical Reactivity - Study Guide.* Kotz  
*Essential Algebra for Chemistry Students, 2<sup>nd</sup> Ed.* David W. Ball.

**Prerequisites:** Placement in ENGL 111X or higher; placement in Math 107X or higher, or a B or better in CHEM 103X; or permission of instructor and department chair. Placement in Math 107X requires a minimum SAT math score of 540/800 or ACT math of 23 with subscores of 14 or better. Placement in ENGL 111X requires minimum SAT critical reading score of 430/800 or ACT English score of 17 or better. **Students not meeting these prerequisites may be removed from the course by the instructor.**

**Course Overview:** Chemistry 105 is the first course in a standard two semester sequence of introductory chemistry for science and engineering majors and is accredited by the American Chemical Society (ACS). Successful completion of the sequence should be transferable to any university. 105X satisfies UAF's Core Curriculum in science (that is what the "X" refers to).

In Chem 105X, we will cover chapters 1-11 of the Kotz text. The topics covered include: 1) making scientific measurements, 2) atomic theory and atomic structure, 3) stoichiometry, 4) aqueous chemistry, 5) thermodynamics, 6) valence bond theory and molecular orbital theory, 7) introduction to organic chemistry, and 8) gas laws.

**Course Goals and Student Learning Outcomes:** As a result of the General Chemistry 105X experience, students will become familiar with and practice the scientific method, acquire basic laboratory skills, learn the basic theory of atomic and molecular structures and the basic laws involving gases and heat transformations, and be able to perform stoichiometric calculations.

**Instructor's Expectations:** Your attendance at lecture is expected (and will be checked through your in-class quiz performance). Each day BEFORE class, the student should read the portion of the textbook that is assigned on the schedule, and begin to work with the assigned OWL questions. With this preparation, you will better be able to understand the discussion, ask questions, and answer "clicker questions" (see below). Please conduct yourself in a business-like and professional manner. Be respectful of the rights other students to a quiet and uninterrupted learning experience. If you arrive late, please enter at the *back* of the auditorium (2<sup>nd</sup> floor level). **Turn off your cell phone ringer. Put away your laptop computer. Listen.**

**Supplemental Learning Opportunities.** OPTIONAL recitation or question/answer sessions will be given by professors, TAs, and/or personnel from the UAF Advising Center. Times and places to be announced. Other help can be obtained from (1) your professor's office hours, (2) your lab TA's office hours or extra time at the end of lab, and/or (3) you may be eligible for free tutoring at UAF's Student Support Service office (<http://www.uaf.edu/sssp/>)

**Chemistry and Department Policy on Cheating:** Any student caught cheating will be assigned a course grade of "F". The student's academic advisor will be notified of this failing grade and the student will not be allowed to drop the course. Unauthorized "dry labs" and unauthorized collaborations during exams and quizzes are *examples* of cheating.

**As a UAF student, you are subject to UAF's Honor Code:**

*"Students will not collaborate on any quizzes, in-class exams, or take-home exams that will contribute to their grade in a course, unless permission is granted by the instructor of the course. Only those materials permitted by the instructor may be used to assist in quizzes and examinations.*

*Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports. No work submitted for one course may be*

*submitted for credit in another course without the explicit approval of both instructors. Violations of the Honor Code will result in a failing grade for the assignment and, ordinarily, for the course in which the violation occurred. Moreover, violation of the Honor Code may result in suspension or expulsion.”*

**Grading:** Your final grade will be based on the following formula:

Total points (700) = Exam 1 (100) + Exam 2 (100) + Exam 3 (100) + Final exam (100) + Lab (100) + Homework (100) + Quizzes (100)

where the numbers in parenthesis corresponds to the number of possible points. Obtaining an overall 90%, 80%, 70% and 60% of the total points will guarantee a final grade of A, B C or D respectively. I may make small changes to this scale at the very end of the semester but any changes will be in your favor. I will not be using +/- grades.

**Extra Credit:** Up to 18 extra credit points may be added to your total earned points. Up to 8 of these extra credit points can be obtained from doing the extra credit homework problems. There will also be a “post-test” given in the last laboratory section that can result up to 10 more extra credit points.

**Laboratory:** An important component of Chem 105 is the laboratory session. The purpose of the lab is to reinforce lecture concepts through hands-on investigation. You will also gain skills in scientific reasoning and use of chemicals and laboratory apparatus. Teaching assistants, who will have specific office hours, conduct the labs. Your final lab grade will be based on the scores of the best ten (out of 11) lab reports. There are no make-up labs. **You must complete at least eight laboratory reports and experiments in order to pass Chem 105. Turning in only seven reports results in an automatic F in the course!**

There are significant hazards in any chemistry laboratory. If you suspect you are pregnant or have other health concerns, you should contact your doctor. For most individuals, the most significant concern is eye safety. **You are required to continually wear approved eye protection while in the laboratory.** Having safety glasses pushed onto your forehead is not acceptable. **Being uncooperative in obeying our safety policies may result in a faculty initiated withdrawal from the course.**

To ensure enrollment in the course, it is important that you attend the first and second laboratory sessions. **If you do not attend these sessions, you will be dropped from the class roster.** You will take a placement exam during the first laboratory session that will focus on high school chemistry whose purpose will be advisory in nature and will not count toward your final grade. The second lab is a safety lab and will be graded.

It is also critical that you arrive to lab prepared and on time. **Students who arrive unprepared or late may be refused admittance into the lab.**

Other details of the laboratory will be provided by your TA.

**Exams:** Three exams are scheduled for the course along with a cumulative 2-hour final. All exams count toward your grade; **there are no dropped exams. Make-up exams** will be allowed for good reasons, which you **MUST DISCUSS** with the professor. “I slept in” is not a good reason (But if you are late, or even very late, to the exam, we can accommodate you). An unexplained absence from an exam results in a zero. If you anticipate an absence (intercollegiate sports, travel on military or University business), talk to your professor ***before*** the exam to make arrangements. If the absence is unexpected (illness, family or personal calamity, cold weather transportation difficulty), talk with the professor at the earliest possible opportunity. Come prepared to **document** your particular calamity. **Do not wait until the next class to speak with me about a missed exam.** In any case, you must take the makeup exam within 1 week of your return to health. **If you are to take a makeup exam, we expect that you have no knowledge of the original exam.**

During hour and final exams programmable and/or graphing calculators, cell phones, beepers, PDAs, and other electronic devices are NOT allowed on your person. Power-off any such item, and place it inside your closed briefcase, purse, or pack at the back of the room, or on the floor.
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You are allowed to bring a non-programmable/graphing calculator. Important constants will be itemized on the front page of each exam and a simple periodic table will be provided.

The final exam will be a standardized American Chemical Society exam that has 70 questions that will cover the entire Chem 105X course. The ACS official guideline book for taking general chemistry exam will provide details about the types of questions you will encounter and a strategy for approaching questions. It also has sample problems (with solutions) to help you practice for the exam. The questions you will encounter are no more difficult than those in the first three exams.

**The time (Wednesday, May 6<sup>th</sup> from 1-3 PM) and place (201 Reichardt) of the final exam have been set by the UAF Registrar, not your professor. No early or late exams can be scheduled. If you miss the scheduled exam due to travel, then the University policy on Incomplete (I) grades will be invoked.**

The only way to do well on the exams is to practice the concepts and calculations presented in class and in the laboratory. There are numerous mechanisms to get this practice: worked problems in class, supplemental instruction, text problems, the ACS guide to taking the general chemistry exam, OWL homework, and in-class quizzes.

#### **OWL Homework:**

**Online Web Learning (OWL):** Homework problems will be done using the OWL system, developed at the University of Massachusetts Amherst. The link to the OWL registration page is shown below or can be found on the course homepage. You must obtain an OWL card. 1/7<sup>th</sup> of your grade is based on OWL homework.

**OWL:** OWL questions will be due 1-to-3 days after the chapter has been discussed in class, generally twice weekly. OWL assignment due dates are listed at the OWL website. The OWL assignment will amount to about 5 to 7 sections per week. Students will have **5 chances** to solve assignment questions. At the end of the semester, your total OWL points on required questions will be scaled to 100 points and added to the semester total.

If you have a serious problem that prevents you from completing an OWL assignment on time, a several-day extension may be granted. *No more than 5 extensions will be granted in a semester.* Request the extension by email. You should expect a reply to your email within a day or two stating that the due date for your assignment was extended for 1 week. You may continue to work on your OWL homework while you are waiting for my reply since you will receive credit for work done once the extension is granted.

Link for purchasing OWL cards online

<http://owl.cengage.com/partners/brookscole/epin.html>

Link for first-time registering in OWL, and other information:

<http://owl.cengage.com/partners/brookscole/help/reglogin.html>

Link for logging into OWL after you have registered:

<http://owl.cengage.com/owl-c/user/loginpage.cgi?Server=owl-univalaskafairbankskotz7e&UserType=Student>

Chemistry Now website: The OWL website for the course also contains additional materials that may help you learn chemistry, including chemistry videos, pre-tests in multiple choice format, and step-wise solutions to Study Questions (those marked by the ■ symbol in the text).

Success in Chemistry 105 requires practice doing problems. Higher achievement in these courses and on exams is strongly correlated with time spent doing homework assignments in their entirety. *In a recent assessment, we found that students who failed the course invariably did not do out of class OWL problems on a regular basis and/or had large number of absences.*

Occasionally there will be additional units present that will be marked as “Extra Credit”. Points earned from extra credit problems will be added to your final score according to the following equation (a total of 8 extra credit points is possible to be added to your final score):

$$\text{Final\#ExtraCreditPoints} = 8 \times \frac{\text{\#ExtraCreditOWLPoints}}{\text{Total\#PossibleExtraCreditPoints}}$$

OWL Tips:

1. Write out the problems and calculations on a sheet of scratch paper.
2. Work on campus where Internet connections are more reliable and very fast.

Computers are available in the department (room 170) for OWL users during normal hours (8:00-5:00).

3. ***Don't wait until just before the due date to start your homework.***
4. If you get the wrong answer, look at the worked out solution before attempting the problem again. You are usually limited to five (5) attempts to complete a unit.
5. Use tables and rules from OWL and not other references (such as the text).
6. **Approach OWL as an opportunity to better understand chemistry and not simply as a chore that needs to be done to earn more points.**
7. Be careful about how you enter your responses into the computer.
  - Spelling errors are serious. For instance nitrate and nitrite are very different species and while carbonate is an important anion, carbonite is unknown.
  - Formatting is very important. For instance, OWL will accept  $\text{CO}_3^{2-}$  but not  $\text{CO}_3^{-2}$  for the formula of carbonate. Many questions will deal with acetic acid or acetate which need to be written as  $\text{CH}_3\text{COOH}$  or  $\text{CH}_3\text{COO}^{-}$  respectively.
  - Be aware of significant figures.
  - Don't give a compound when the question asks for an element. (i.e., be aware of exactly what the question asks for).
  - Understand how to enter formulas and scientific notation.

**Quizzes:** Many lectures will incorporate a quiz that will cover recent material. These quizzes will be projected on the screen and your answers will be submitted via your response cards. You will receive two (2) points for each correct answer, one (1) point for each incorrect answer, and zero (0) points for no answer. **About 50 questions will be asked throughout all the lectures this semester. You will be allowed ten zero clicker scores without penalty, to take into account the (hopefully few) days you miss class due to travel on University business, sickness, or your clicker batteries ran down, or other legitimate causes. No "makeup clicker questions" will be given. No answers on paper can be accepted.**

<p>"Clicker by proxy" is a no-no. <b>Click only your own clicker!</b></p>
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**Register your clicker ID on the Blackboard website;** do not register your clicker using the OWL website. Look for **Tools** on the left panel, then find **TurningPoint Registration Tool**. Your clicker ID is the 6 digit code (letters and/or numbers) located under the bar code on the back of the clicker. **Clicker IDs must be registered by Sunday, February 1 at 6:00 PM.**

Spare batteries for your card can usually be purchased for about \$1.50 in the chemistry office (room 194).

There are generally two ways to tell if your clicker is functioning. First, the green light should turn on when you submit an answer. A better (and more reliable) test, however, is by monitoring your personal number on the response table during any quiz. Please see

me at the end of class if the response table does not respond to your clicker. Early in the semester we will have a mechanism for you to test your clicker before class by using the computer in the display case located across from the stairwell at the lower level of the Reichardt Building.

I advise you to save your receipt for your clicker. It may be warranted. You should also place your name and contact information on the clicker in the event that it is misplaced.

**Freshman Grade Reports:** I will primarily use a combination of your first exam grade (75%) and your quiz average (25%) to estimate your progress in the course for the freshman grade report.

**Faculty Initiated Withdrawals:** Students who 1) do very poorly on the first exam and 2) have a poor attendance records (based on quizzes), or poor OWL completion scores, or are not current with their laboratory work may, at my option, be removed from the course.

**Students with documented disabilities** who may need reasonable academic accommodations should discuss these with me during the first two weeks of class. You will need to provide documentation of your disability to Disability Services in the Center for Health and Counseling, 474-7043, TTY 474-7045.

**Important Dates:**

- Last day to drop class and get 100% refund ..... Friday, Jan.30
- Last day to drop class w 50% refund (course not on academic record) .....Friday, Feb. 6
- Freshmen progress reports due .....Friday, Feb. 27
- Last day for student- or instructor- withdrawal (“W” on academic record) .Friday, Mar. 27
- Last day of instruction: ..... Monday, May 4

## General Chemistry 105X

## TENTATIVE SCHEDULE

Spring 2009

Date	Day	Ch.	Approximate coverage	Topics	Lab Experiments
Jan 23	F	1	-	Syllabus. Elements, compounds	No lab
Jan 26	M	1	1.1-1.6	Physical properties, math	SIGN-IN & Pre-Test
Jan 28	W			Measuring properties, dimensional analysis	Attendance is
Jan 30	F	2	2.1-2.5	Atoms, isotopes, periodic table	MANDATORY.
Feb 2	M	2	2.6-2.10	Ionic and molecular compounds	1. Chemical Health&
Feb 4	W	2	2.10-2.11	Molecules, moles, % composition	Safety. Attendance is
Feb 6	F	3	3.1-3.4	Balancing chemical equations	MANDATORY.
Feb 9	M	3	3.5-3.7	Precipitation reactions, acids and bases	2. Introduction to Lab
Feb 11	W	3	3.8-3.10	Gas-forming reaction, redox reactions	Techniques
Feb 13	F	4	4.1-4.2	Stoichiometry, limiting reactant	
Feb 16	M			Review	3. Identifying
Feb 18	W			<b>EXAM 1 - Chapters 1-3</b>	Unknown Substance
Feb 20	F	4	4.3-4.4	% yield, chemical analysis	
Feb 23	M	4	4.5-4.7	Molarity (M)	4. Intro to Aqueous
Feb 25	W	4	4.8	Spectrophotometry	Reactions
Feb 27	F	5	5.1-5.3	Specific heat	
Mar 2	M	5	5.4-5.6	Enthalpy of reaction, calorimetry	5. Copper Cycle
Mar 4	W	5	5.7-5.8	Heat of formation, fuels	
Mar 6	F	6	6.1-6.5	EM spectrum, Schrödinger equation	
Mar 9	M			Spring Break (no class)	(no lab)
Mar 11	W			Spring Break (no class)	
Mar 13	F			Spring Break (no class)	
Mar 16	M	6	6.6-6.7	Atomic orbitals	6. Enthalpy of
Mar 18	W			Review	Neutralization
Mar 20	F			<b>EXAM 2 - Chapters 4-6</b>	
Mar 23	M	7	7.1-7.3	Quantum numbers	7. Introduction to
Mar 25	W	7	7.4-7.5	Electron configurations	Spectroscopy
Mar 27	F	7	7.6-7.7	Periodic trends	
Mar 30	M	8	8.1-8.4	Lewis electron dot structures, resonance	8. Spectroscopy and
Apr 1	W	8	8.5-8.7	Molecular geometry	Water Hardness
Apr 3	F	8	8.8-8.10	Polarity, bond order	
Apr 6	M	9	9.1-9.2	Hybridization	9. Isotopes and
Apr 8	W	9	9.3	Molecular orbital theory	GC-Mass Spec
Apr 10	F	9	9	MO orbitals and computational chemistry	
Apr 13	M			Review	10. Computational
Apr 15	W			<b>EXAM 3 - Chapters 7-9</b>	Chemistry Using
Apr 17	F	10	10.1-10.2	Organic chemistry, hydrocarbons	<i>HyperChem</i>
Apr 20	M	10	10.2	Hydrocarbons, drawing isomers	11. Gas Laws
Apr 22	W	10	10.3-10.4	Alcohols, ethers, carbonyl-containing	
Apr 24	F			UAF SpringFest (No class)	
Apr 27	M	11	11.1-11.3	PV=nRT	Post-test
Apr 29	W	11	11.4-11.6	Gas mixtures, kinetic theory	
May 1	F	11	11.7-11.9	Real gases	
May 4	M			Review	<b>No Lab</b>
May 6	W			<b>FINAL EXAM - Chapters 1-11</b> <b>(1-3 PM in Reichardt 201)</b>	