CHEMISTRY 106X  GENERAL CHEMISTRY II  Spring 2013

Lecture Time:  MWF 1:00-2:00 PM
Place:  201 Reichardt Building
Instructor:  Catherine F. Cahill
Office:  368 Reichardt Building
Office Hours:  MWR 2:15-5:00 PM and by appointment (call or email me)
Telephone:  474-6648
E-mail:  cfcahill@alaska.edu
Laboratory Director:  Emily Reiter (Office: 192 Reichardt; Tel: 474-6748; Email: e.reiter@alaska.edu)

Required Materials:
(2) OWL access card for Chemistry and Chemical Reactivity 8th Ed
(3) TurningPoint Technologies ResponseCard RF radio frequency clicker (new or used) or TurningPoint smartdevice app
(4) Experiments in General Chemistry 106X: A Laboratory Manual (Free! Download and print from BlackBoard.)
(5) 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. A cheap (~$10) calculator will be satisfactory for this course provided it has the ability to do 10^x, LOG, EXP or e^x, LN, and x^y functions.

Optional Materials (these materials are optional, but may help you study):
(1) American Chemical Society (ACS) General Chemistry Study Guide
(2) Chemistry and Chemical Reactivity 8th Ed. Student Solutions Manual by Banks
(3) Chemistry and Chemical Reactivity 8th Ed. Study Guide by Moran and Townsend
(4) Essential Algebra for Chemistry Students 2nd Ed. by Ball

Prerequisites (from the 2012-2013 catalog at: http://www.uaf.edu/catalog/current/):
C Grade or better in CHEM F105X; placement in ENGL F111X or higher; placement in MATH F107X or higher; or permission of instructor and department chair. Co-requisite: CHEM F106L. Students must be enrolled in both CHEM F106X and CHEM F106L to receive full credit. Students not meeting these prerequisites may be removed from the course by the instructor.

Course Description (from the 2012-2013 catalog at: http://www.uaf.edu/catalog/current/): Major subjects include reaction kinetics, equilibrium (including acids and bases, solubility and complex ion formation), nuclear chemistry, electrochemistry, and descriptive chemistry of the elements.

Course Goals and Student Learning Outcomes: As a result of the General Chemistry II (CHEM 106X) experience, students will have practiced using the scientific method, exercised basic laboratory skills, learned the basic theory of reaction kinetics and how it
relates to equilibrium chemistry, worked with the principles and applications of electrochemistry, and learned the basics of nuclear chemistry and energy. Student Learning Outcomes will be assessed through an American Chemical Society national standard chemistry exam given during the final exam period.

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 be better 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 (2nd floor level). Turn off your cell phone ringer. Put away your laptop computer. Listen.

Electronic Communications: I will attempt to reply to any student email within 24 hours during the workweek and by noon on Monday if the message is received over a weekend. I will only communicate with @alaska.edu email addresses. As a policy, I do not use Facebook, Twitter, Linked-In, text messaging, etc., to communicate with students, so please email me from an @alaska.edu email address or call my office phone if you need to contact me. Remember that emails are professional communications so please be respectful in your emails with me, your TAs, and any other persons associated with this course.

Supplemental Instruction and Drop-in Coaching: Supplemental instruction (SI) and drop-in coaching are available for CHEM 106X through the Chemistry Learning Center (CLC). SI and drop-in coaching times and locations will be listed in the calendar on the CLC webpage (http://www.uaf.edu/chem/clc/) and on the CHEM 106X Blackboard site. You may also get help during: (1) your professor’s office hours, (2) your lab TA’s office hours, and (3) extra time at the end of lab.

Grading: Your course grade will be determined by your combined scores from three one-hour exams, final exam, laboratory, OWL homework, and clicker quizzes. The point breakdown is given below:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 hour-long exams (100 points each)</td>
<td>300 points</td>
</tr>
<tr>
<td>Final exam (May 8\textsuperscript{th}, 1:00-3:00 PM)</td>
<td>100 points</td>
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<tr>
<td>Laboratory</td>
<td>100 points</td>
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<tr>
<td>OWL homework</td>
<td>100 points</td>
</tr>
<tr>
<td>Clicker quizzes</td>
<td>100 points</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>700 points</strong></td>
</tr>
</tbody>
</table>
The tentative grade scale is as follows:

- 630-700 points       A
- 560-629.9 points      B
- 490-559.9 points      C
- 420-489.9 points      D
- <419.9 points         F

I may curve the grades so that lower point totals than listed in each range above get a higher grade, but if you get the lowest number in the range listed above, you are guaranteed at least that grade. I will not use +/- grading.

**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.**

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.

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.

The final exam will be a standardized American Chemical Society exam that has 70 questions that will cover the entire CHEM 106X 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 8th 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 clicker quizzes.

**Laboratory:** An important component of CHEM 106X 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 experiments and laboratory reports in order to pass CHEM 106X. 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.**

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.

**Online Web Learning (OWL) Homework:** Homework problems will be done using the OWL system, developed at the University of Massachusetts Amherst. 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. You have 20% of your OWL grade as a ‘buffer’. These points are guaranteed and can be used to make up for missed assignments due to computer failures, being out of town, prioritizing your time for some other class, etc. Because you have this 20% buffer, I will not extend any OWL deadlines for an individual student.

Success in CHEM 106X requires practice doing problems. Higher grades in this course and on exams is strongly correlated with time spent doing homework assignments. An
analysis of Fall 2012 CHEM 105X exam scores, overall course grade, and OWL grades shows that the students who did well in OWL, did well on their exams and overall.

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 $\text{CH}_3\text{COO}^-\text{^-}$ 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.

**Clicker Quizzes:** Many lectures will incorporate a clicker quiz that will cover recent material. Your clicker/smartdevice numbers must be registered online in the Blackboard system by **Sunday January 27**th to receive credit for your responses clicker quiz responses. 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. **You can miss 20% of your clicker points without penalty (a 20% buffer like you have for OWL), to take into account the (hopefully few) days you miss class due to travel on University business, sickness, run down clicker batteries, or other causes. No “makeup clicker questions” will be given. No answers on paper can be accepted.**

“Clicker by proxy” is cheating.
Click only your own clicker!

Spare batteries for your clicker can usually be purchased at cost for $1.50 in the chemistry office (room 194).

**Freshman Grade Reports:** I will use a combination of your first exam grade, OWL scores, and quiz scores to estimate your progress in the course for the freshman grade report (February 22nd).
**Faculty Initiated Withdrawals:** Students who 1) do very poorly on the first exam and 2) have a poor attendance records (based on clicker quizzes), or poor OWL completion scores, or are not current with their laboratory work may, at my option, be removed from the course. If you are not participating in the course by February 22\(^{nd}\), I will withdraw you from the course.

**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,” unauthorized collaborations during exams and quizzes, and using someone else’s clicker to answer a question are examples of cheating.

As a UAF student, you are subject to UAF’s Student Code of Conduct (online at: http://www.uaf.edu/catalog/current/academics/regs3.html#Student_Conduct):

“Honesty is a primary responsibility of you and every other UAF student. The following are common guidelines regarding academic integrity:

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

2. 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.

3. No work submitted for one course may be submitted for credit in another course without the explicit approval of both instructors.

Alleged violations of the Code of Conduct will be reviewed in accordance with procedures specified in regents’ policy, university regulations and UAF rules and procedures. For additional information and details about the Student Code of Conduct, contact the dean of students or visit www.alaska.edu/bor/.”

**Students with Documented Disabilities:** If you have a documented disability and need reasonable academic accommodations, you should discuss these with me during the first two weeks of class. You will need to provide documentation of your disability to the UAF Office of Disability Services at 208 Whitaker. If you have questions, please contact the director of Disability Services at 474-5655, TTY 474-1827, uaf-disabilityservices@alaska.edu, or through www.uaf.edu/disability/.

**Important Dates:**

- Last day to drop class and get 100% refund .......................................................... Friday, Feb. 1
- Freshmen progress reports due ................................................................. Friday, Feb. 22
- Last day for student- or instructor- withdrawal (“W” on academic record). Friday, Mar. 22
- Last day of instruction: .............................................................................. Monday, May 6
- Final Exam: .................................................................................................. Wednesday, May 8
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<thead>
<tr>
<th>Date</th>
<th>Ch.</th>
<th>Approximate coverage</th>
<th>Topics</th>
<th>Lab Experiments</th>
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<tbody>
<tr>
<td>Jan 18</td>
<td>12</td>
<td>12.1-12.2</td>
<td>Syllabus, Intermolecular forces</td>
<td>No lab</td>
</tr>
<tr>
<td>Jan 21-25</td>
<td>12</td>
<td>12.3-12.6</td>
<td>January 21 - Holiday – No class Intermolecular forces, liquids</td>
<td>No lab</td>
</tr>
<tr>
<td>Jan 28-Feb 1</td>
<td>13</td>
<td>13.1-13.7</td>
<td>Solids, phase diagrams</td>
<td>Excel and gas law review</td>
</tr>
<tr>
<td>Feb 4-8</td>
<td>14</td>
<td>14.1-14.5</td>
<td>Properties of solutions</td>
<td>Ten solutions and unknowns</td>
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<tr>
<td>Feb 11-15</td>
<td>15</td>
<td>15.1-15.4</td>
<td>Chemical kinetics</td>
<td>Silver plate photography</td>
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<tr>
<td>Feb 18-22</td>
<td>15,16</td>
<td>15.5-16.4</td>
<td>Chemical equilibrium</td>
<td>Introduction to kinetics</td>
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<tr>
<td>Feb 25-Mar 1</td>
<td>16,17</td>
<td>16.5-17.6</td>
<td>Acid/base strength</td>
<td>Kinetics of blue dye oxidation</td>
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<tr>
<td>Mar 4-8</td>
<td>17</td>
<td>17.7-17.10</td>
<td>Acid/base equilibrium</td>
<td>Determination of an equilibration constant</td>
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<tr>
<td>Mar 11-15</td>
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<td>Spring Break! No classes</td>
<td>No lab</td>
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<tr>
<td>Mar 18-22</td>
<td>18</td>
<td>18.1-18.8</td>
<td>Titrations and solubility</td>
<td>Volumetric analysis and acid-base titrations</td>
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<tr>
<td>Mar 25-29</td>
<td>19</td>
<td>19.1-19.7</td>
<td>Entropy and free energy</td>
<td>Hydrolysis of salts and behavior of buffers</td>
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<td>Apr 1-5</td>
<td>20</td>
<td>20.1-20.8</td>
<td>Oxidation and reduction reactions</td>
<td>Thermodynamics and solubility of borax</td>
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<tr>
<td>Apr 8-12</td>
<td>23</td>
<td>23.1-23.7</td>
<td>Radioactivity</td>
<td>Voltaic cells and free energy</td>
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<tr>
<td>Apr 15-19</td>
<td>23</td>
<td>23.8-23.9</td>
<td>Medicinal Chemistry</td>
<td>Nuclear chemistry</td>
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<tr>
<td>Apr 22-26</td>
<td>21</td>
<td>21.1-21.8</td>
<td>Main group chemistry</td>
<td>No lab</td>
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<tr>
<td>Apr 29-Mar 3</td>
<td>21-22</td>
<td>21.9-22.7</td>
<td>Transition metals</td>
<td>Review session</td>
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<td>Mar 6-8</td>
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<td>March 6 – ACS review</td>
<td>No Lab</td>
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<td>March 8 - FINAL EXAM</td>
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<td>(1-3 PM in Reichardt 201)</td>
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