

CHEMISTRY 106X General Chemistry II
Fall 2008

Instructor: Dr. Sarah Petitto Office: Reichardt Building, Room 182
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Lecture: MWF 9:15-10:15 am, Reichardt Building, Room 201B

Office Hours: M 11:30 am-12:30 pm
WF 10:30 am-12:00 pm
By appointment

Required Materials: Text: *Chemistry & Chemical Reactivity*, 6th ed.; by Kotz, Treichel and Weaver.

Lab Text: *Experiments in General Chemistry; 106; A Laboratory Manual; University of Alaska Fairbanks*, which will be handed out in during your first laboratory class.

Preparing for your ACS Examination in 2nd Semester General Chemistry; The Official Guide available at the UAF bookstore.

Calculator with the standard arithmetic keys along with Log, 10^x, Exp, Ln, and e^x keys is suitable; please learn how to use it.

Please Note: Programmable Calculators are NOT allowed during Exams, no exceptions.

OWL pin number and working registration.

OWL Course: Chem106X Fall 08 Day, Section# 1, Instructor Petitto, Location REIC 201B, Time 9:15 to 10:15 am

Turning Technologies' ResponseCard RF clicker available at the UAF bookstore for use in daily quizzes in lecture. Batteries are available \$1.50 in the Chemistry Office, Room 194 from 8 am - 5 pm from Mist D'June Gussak.

Extra Materials: Solution Manual for the above text, *Chemistry & Chemical Reactivity*, 6th ed.; by Kotz, Treichel and Weaver.

Prerequisites: The course is conducted assuming the student has successfully completed Chemistry 105X or a transfer course with similar content, with a C grade or better. Students who have not successfully passed Chemistry 105X may be dropped from the course.

Chemistry 106 is the second half of a two-semester course in introductory chemistry where we will cover Chapters 13-23 in the text building on the materials and concepts you learned and developed in Chemistry 105. Completion of the Chemistry 105/106 sequence should be transferable to any university.

The goals for this course is to continue build your skills as problem-solvers, which include; critical reading, problem-solving, carrying out laboratory experiments, communication of information, self-confidence, and self-reliance.

The syllabus contains a detailed schedule of the material being covered. The course will focus on intermolecular forces, properties of solutions, nuclear chemistry, kinetics, equilibria, acid and base chemistry, thermodynamics, electrochemistry redox reactions, and chemistry of the periodic table.

The lectures are structured assuming that you have read the suggested material in the textbook and/or handouts prior to coming to class. The course has an accompanying website http://www.uaf.edu/chem/petitto/chem106_f08 and site on Blackboard, where a copy of the course materials, a calendar of due dates and academic holidays/deadlines, links to helpful websites, and your grades (on Blackboard only). Please check these sites and your e-mail regularly for the most up-to-date course information.

Grades: A total of **700 points** are possible for Chemistry 106 and are explained in the table below. *Please note that your grade is in your hands.* Any assignment/exam that is considered excellent (answers are complete/correct, format has been followed, a solid grasp of the material is demonstrated, and work substantially exceeds minimum requirements) will receive an A. Consistent submission of excellent work will earn you an A in the course. I also reserve the right to adjust these percentages *only in the students favor* when assigning final grades.

Letter Grade	Percentage Grade	Total Points
A+	100 - 94.5	700 - 662
A	94.4 - 90.5	661 - 634
A-	90.4 - 87.5	633 - 613
B+	87.4 - 84.5	612 - 592
B	84.4 - 80.5	591 - 564
B-	80.4 - 77.5	563 - 543
C+	77.4 - 74.5	542 - 522
C	74.4 - 70.5	521 - 494
C-	70.4 - 67.5	493 - 473
D+	67.4 - 64.5	472 - 452
D	64.4 - 60.5	451 - 424
D-	60.4 - 57.5	423 - 403
F	57.4 or lower	402 or lower

- Exams (42.85% or 300 points): There will be 3 1-hour exams (100 points each) held during class. There will be **no dropped exams**. If you are unable to take an exam at the scheduled time, you must inform the instructor at least **48 hours before** the exam in order to make special arrangements and if the absence is *unexpected*, contact the instructor **immediately**. Please do not wait until after the exam or the next lecture period to discuss missing the exam as you will **receive a 0 for the exam**. However, only in the event of some extraordinary circumstance or unavoidable tragedy will a make-up exam be administered. *Practice exams* will be available 1 week before the exam; you are strongly encouraged to complete these exams as they will be *very similar* to the exam being given.
- Final Exam (14.29% or 100 points): A 2-hour comprehensive final will be given during the final exam period as determined by UAF, which is listed in the lecture/laboratory schedule. The final exam will be the American Chemistry Society (ACS) Second Term General Chemistry Exam, which is a multiple choice exam. Most of the Chemistry 105 course material will not be on the exam, except basic Organic chemistry. The official ACS guideline book will be useful in preparing and providing details about the type of exam questions and strategy for approaching these questions. Sample problems with solutions also are available within the guide book and are most useful to practice with.
- Laboratory Report (14.29% or 100 points): The 10 best of the 11 total laboratory reports will be used as your laboratory grade. **You must complete at least 8 laboratory reports and experiments in order to pass Chemistry 106**. Laboratory report grading will be done by your Laboratory Teaching Assistant (TA), not the course lecturer, therefore, all regrades and comments should be directed to your Laboratory TA.
- In-Class Quizzes (14.29% or 100 points): This grade reflects how well you understand the material being presented in class. Quizzes will be graded and recorded using the Turning Technologies' ResponseCard RF clicker where a correct answer is worth 2 points, an answered incorrect question is worth 1 point, and no answer is worth 0 point. These quizzes also act as an attendance taker. There are **60 quiz questions** that will be asked during the lectures, and you will be allowed **10 zero (0) clicker points without penalty for a total of 50 questions**.
- On-line Web Learning (OWL) Homework (14.29% or 100 points): Homework problems will be completed using the OWL system. It is the student's responsibility to have an OWL pin and registration in order to complete the homework assignments. OWL homework chapter assignments will have multiple due dates to split up the work load and to hopefully prevent "just get the homework done cram sessions".
 - OWL homework sections are **due at 11:00 pm Alaska standard time on Tuesdays and Fridays**, see course assignment calendar and OWL for specific due dates of OWL assignments.

- Owl assignments will amount to about 3 to 5 sections per due date assignment
 - You will have **5 chances** to solve and answer the questions and **2 of 3 correct** answers for “**mastery**”
 - Every student is allowed **5 late** OWL homework assignments where **extensions** are to be **requested before the OWL due date** and the OWL assignment is to be **completed 1 week** after the original OWL due date.
 - Additional late OWL homework assignments, after the initial late 5 OWL homework assignments, will result in a **0 grade** for those homework assignments.
- Extra Credit (+2% or 14 points): You will have the option of doing up to **12 “end of chapter”** problems for each chapter in OWL for extra credit, which will be worth **1 extra credit point**. **Extra credit points will only be awarded if the original OWL assignments were completed on-time**. Please remember, that you only have **1 attempt** to do the “end of chapter” problems. Hence, it is important that you feel prepared and have your text handy when you attempt these problems. Also, there is a beginning and end of the course **OWL Survey** that is required and will be worth **1 Extra credit point each**.

Course Policies:

- Instructor’s Expectations of the Students: You are expected to be familiar with all policies, procedures, materials, scheduled homeworks, exams, and labs, as well as due dates outlined in this syllabus and the accompanying documentation for this class. **You are to bring your textbook and Clicker to class every day**.
- Lecture: You are expected to attend lectures, take notes, participate in quizzes (i.e. bring your Clicker to class), and interact with others and the instructor. Please be respectful of other students. Arrive on time and conduct yourself in a professional manner. If you arrive late, please enter at the back of the auditorium. Please remember to **turn off** your cell phones or put your phone on *vibrate* only if you are expecting an emergency phone call.
- Laboratory: The lab section of Chemistry 106 is used to reinforce lecture concepts through hands-on investigation, to gain skills in scientific reasoning, and use of chemicals and laboratory apparatus. Teaching Assistants (TA’s) will have specific office hours and will grade the labs. Your final lab grade will be based on the scores of the best 10 (out of 11) lab reports. **You must complete at least 8 laboratory reports and experiments in order to pass Chemistry 106**.
 - Enrollment guarantee in your laboratory section requires that you **attend the 1st laboratory session**. If you **do not** attend this session, you may be **dropped** from the class roster, which will enable a wait-listed person to enroll and you will find yourself on the wait-list.
 - Laboratory time is a premium in this course and your TA and I expect you to spend the lab period **performing** the lab rather than figuring out how to do the lab. You are welcome to leave if you finish a lab before the period ends, though

I **strongly** encourage you work through the entire lab period given that you, your partner(s), and your laboratory TA are available during this time.

- Please remember there are significant hazards in any chemistry laboratory. If you suspect you are pregnant or have other health concerns, you should contact your doctor and inform your Laboratory TA and the Laboratory Director, Emily Reiter (REIC Room 194A, 474-6748, fnear@uaf.edu). For most individuals, the most significant concern is eye safety. You are required to **continually wear approved eye protection when in the laboratory**. 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.*
- Office Hours: Posted office hours are M 11:30 am-12:30 pm and WF 10:30 am-12:00 pm. If you need to see me outside scheduled office hours, please feel free to stop by my office or make an appointment. Please note that if my office door is closed, I am not available at that moment and remember helping you outside scheduled office hours without an appointment or outside normal working hours (M-F, 8:00 am-5:30 pm) is a courtesy granted at my discretion and limited by my schedule.
- Regrade Policy: If you feel a mistake has been made in grading, you may request *in writing* for it to be regarded, though please note “regrade” means that I **regrade the whole paper again**, not just the section you have discrepancy with. Regrade requests are to be made *in writing and accompanied by the assignment* you feel contains an error within **48 hours** of the material being returned.
- Clickers and Quizzes: In order to get full credit for your quizzes, you **must** bring to class your ResponseCard Clicker that is registered to you and only to you (no exceptions). You can register your card using the OWL homepage.
 - Student should label their Clickers with the name and contact information in case the Clicker is misplaced.
 - Students should email Dr. Petitto with their Clicker ID number consisting of 6 characters both numeric and alphabetic, which is found on the back of the Clicker. Dr. Petitto will then email each student back with your individual Clicker response number.
 - Spare batteries for your card can usually be purchased for about \$1.50 in the chemistry office (REIC Room 194 8:00 am - 5:00 pm) from Mist D’June Gussak.
 - There are generally two ways to tell if your Clicker is functioning.
 1. The green light should turn ON when you submit an answer.
 2. 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.
 - Save your receipt for your Clicker. It may be warranted at the bookstore.
- Lost Points: Points lost due to late work, unexcused absences, malfunctioning RF Clickers, or shared course work cannot be made up.

- Plagiarism, Cheating, or Disruptive Behavior: Students will be disciplined following UAF policies and procedures, www.alaska.edu/bor/regulation/9r/r09-02.html. 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," collaborations during exams, "clicker by proxy", and use of cell phones, programmable calculators, iPods, or mp3 players during an exam or quiz are *examples* of cheating.
- Freshman Grade Reports: The combination of your first exam grade (50%), your quiz average (25%), and your OWL Homework average (25%) will be used to estimate your progress in the course for the *Freshman Grade Report due on Friday October 10th*.
- Tutoring: Students **are encouraged to get extra help sooner rather than later**. Chemistry is cumulative; therefore, a strong understanding of the basics is necessary for your continued learning. If you are needing extra help, please come see me during my office hours, your Laboratory TA's office hours, other Laboratory TAs' office hours, or use the free tutoring services offered by the Chemistry Department, a schedule is listed outside of REIC Room 170.
- Faculty Initiated Withdrawals: Students who do very poorly on the first exam, have a poor attendance records (based on quizzes), poor OWL completion scores, or are not current with their laboratory work *may be removed* from the course at the discretion of the Lecturer, Dr. Petitto by the last day to Withdrawal with a "W" on Friday, October 31st.
- Students with Disabilities: Any student who may need reasonable academic accommodations should discuss these with Dr. Petitto 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.

OWL Homework: Homework assignments will be administered via an interactive computer based program called OWL. Higher achievement in Chemistry 106 and on the exams is strongly correlated with the time spent doing homework assignments and practice problems. In a recent assessment, the chemistry department 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 absence*. In addition, please note that your **OWL score counts the same** towards your final grade as an **exam** in the course.

All OWL homework is due at 11:00 pm Alaska standard time on Tuesdays and Fridays, see course assignment calendar and OWL for specific due dates of OWL assignments.

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 (REIC Room 170) for OWL users during normal hours (8:00 am-5:00 pm).
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 limited to **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. You will be given **5** chances to obtain the correct answers for *all* questions. If you miss a question, carefully read OWL's worked out solution before you proceed to your next attempt.
8. Other helpful OWL tips
 - a. Be careful about how you enter your responses into the computer.
 - b. Spelling errors are serious: nitrate and nitrite are very different species, while carbonate is an important anion, carbonite is unknown.
 - c. Formatting is very important: OWL will accept CO_3^{2-} but not CO_3^{-2} for the formula of carbonate. Many questions will deal with acetic acid or acetate which needs to be written as CH_3COOH or $\text{CH}_3\text{COO}^{-}$.
 - d. Be aware of significant figures!
 - e. Be aware of units!
 - f. Do not give a compound when the question asks for an element. (i.e., be aware of exactly what the question asks for).
 - g. Understand how to enter formulas and scientific notation.

Chemistry 106 Schedule for Fall, 2008 for Dr. Petitto's MWF 9:15-10:15 am Section

Date	Topic (Highlights)	Lab
Sep 5 st	<p>Thursday, September 4th 1st day of Classes,</p> <p>Friday, September 5th, Introduction to Chemistry 106, start Chapter 13</p>	No Lab
Sept 8 th Sept 10 th Sept 12 th	<p>Chapter 13- Intermolecular Forces</p> <ol style="list-style-type: none"> 1. H-bonding, London Dispersion, Dipole-Dipole... 2. Effects on boiling points, vapor pressure, surface tension, critical temperatures... 3. Phase diagrams <p>Clickers Quizzes start on Friday, September 12th.</p> <p>Friday, September 12th last day for late registration and 100% tuition refund</p>	Lab Check-In and Math Review (OWL)
Sept 15 th Sept 17 th Sept 19 th	<p>Chapter 14- Solutions</p> <ol style="list-style-type: none"> 1. Units of concentration: molarity (M), molality (m), mole fraction (X), percent, ppm... 2. Solubility of Gases (Henry's Law) 3. Effect of temperature on solubility of gases and other compounds 4. Colligative properties: boiling and freezing points, osmotic pressure, vapor pressure 5. Colloids <p>Friday, September 19th is last day to drop without having a W on your transcript and 50% tuition refund</p>	No Lab
Sept 22 nd Sept 24 th Sept 26 th	<p>Chapter 23- Nuclear Chemistry</p> <ol style="list-style-type: none"> 1. Nuclear reactions (transmutations & radioactive decay) 2. Types and properties of radioactive decay (α, β, γ, β^+, and electron capture) 3. Nuclear stability 4. Nuclear energy ($E = \Delta mc^2$) 5. Rate of radioactive decay (first order) 6. Health Issues regarding radiation 7. Uses of radioactive isotopes 	Exp #1: 10 Solutions, 10 Unknowns
Sept 29 th Oct 1 st	<p>REVIEW AND / OR CATCH-UP, September 29th</p> <p>EXAM I ON WEDNESDAY, October 1st on CHAPTERS 13, 14, 23</p>	Exp #2: Introduction to Nuclear Chemistry

Oct 3 rd Oct 6 th Oct 8 th	<p>Chapter 15- Kinetics</p> <ol style="list-style-type: none"> Rate laws: <ol style="list-style-type: none"> initial rate data integrated rate laws and graphical plots mechanism and the rate determining step Half-life for 1st order reactions Arrhenius equation (E_a, k, T relationships) Catalyst, intermediates, E_a, $\Delta H...$ 	Exp #3: Kinetics of Oxidation
Oct 10 th Oct 13 th Oct 15 th Oct 17 th	<p>Friday, October 10th Freshman Progress Reports</p> <p>Chapter 16- Equilibria</p> <ol style="list-style-type: none"> K vs. Q favorability of a reaction, quantitative aspects, direction of reaction Manipulating chemical reactions and K LeChatelier's Principle <p>Wednesday, October 15th is last day to apply for Fall Graduation</p>	Exp #4: LeChatelier and Factors that Affect Equilibrium Constants
Oct 20 th Oct 22 nd Oct 24 th Oct 27 th Oct 29 th	<p>Chapter 17- Acids and Bases</p> <ol style="list-style-type: none"> Defining and recognizing acids/bases (Bronsted-Lowry, Arrhenius, Lewis definitions) Strong vs. weak acids/bases pH scale and calculating pH of strong acids and bases Calculating pH of weak acids/bases given K_a, K_b and $K_a K_b = K_w$ Conjugate acid/base relationships Calculations involving polyprotic acids and bases 	Exp #5: Determination of an Equilibrium Constant
Oct 31 st Nov 3 rd	<p>REVIEW AND / OR CATCH-UP, October 31st</p> <p>EXAM II ON Monday, November 3rd on CHAPTERS 15, 16, 17</p> <p>Friday, October 31st is last day to Withdraw from course with a W on your transcript (*CHECK YOUR GRADES!)</p>	Exp #6: Acid Base
Nov 5 th Nov 7 th Nov 10 th Nov 12 th Nov 14 th	<p>Chapter 18- More on Equilibria</p> <ol style="list-style-type: none"> Buffers: $pH = pK_a + \log\left\{\frac{[B]}{[HB]}\right\}$ Calculations and generalizations regarding acid base titrations Solubility rules of salts; K_{sp} Effects of acids/bases, common ions, and complex ions (K_f) on solubility 	Exp #7: Buffers and Hydrolysis of Salts

Nov 17 th Nov 19 th Nov 21 st	<p>Chapter 19- Free Energy and Entropy</p> <ol style="list-style-type: none"> 1. Three Laws of Thermodynamics 2. $\Delta G = \Delta H - T\Delta S$ 3. Concept of entropy, enthalpy, free energy, and spontaneity 4. Relationships between ΔG, ΔG°, Q, and K 	Exp #8: Salt Solubility
Nov 24 th Nov 26 th Dec 1 st Dec 3 rd	<p>Chapter 20- Oxidation-Reduction (Redox) Reactions</p> <ol style="list-style-type: none"> 1. Terminology: oxidation/reduction; [O]/[R] agents, anode/cathode 2. Algorithm for balancing redox reactions 3. Voltaic vs. Electrolytic Cells 4. Quantitative relationships (amp = C/s; Watt = J/sec = volt amp; $F = 96480 \text{ C}\dots$) 5. Cell potentials (E) 6. Activity series 7. Nonstandard cells; Nernst Equation 8. Relationship between E, E°, K, Q, ΔG, ΔG° and T <p>No Class, Thanksgiving Holiday Break, Thursday-Friday, November 27th-28th and NO Lab this week.</p>	Exp #9: Thermo and Free Energy
Dec 5 th Dec 8 th	<p>REVIEW AND/OR CATCH-UP, December 5th</p> <p>EXAM III ON MONDAY, December 8th on CHAPTERS 18, 19, 20</p>	Exp #10: Voltaic Cells and Free Energy
Dec 10 th Dec 12 th	<p>Chapter 21 & 22- Trends of the Periodic Table Chemistry of the Elements and Transition Metals</p> <ol style="list-style-type: none"> 1. Periodic trends- atomic radii, density, melting point 2. Metallurgy 3. Coordination compounds, description, nomenclature, isomerism... 4. Geometry hybridization of coordination compounds 5. Ligand (crystal) field theory to explain color and magnetic properties <p>Friday, December 12th Last day of Instruction</p>	Exp #11: Make-Up Lab
Dec 15 th	<p>FINAL EXAM ON MONDAY, DECEMBER 15th at 8:00-10:00 am, REIC 201B</p>	