Chemistry 331 Physical Chemistry I Fall 2015

Instructor:	Prof. Catherine F. Cahill
Offices/Lab:	Reichardt 146/Akasofu 303/Akasofu 331
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Lecture:	MWF 10:30-11:30, Reichardt 165
Laboratory:	T 11:30-14:30, Reichardt 245
Office Hours:	MWF 8:00-10:00, T 14:30-16:00, after class, and by appointment
Textbook:	Physical Chemistry Volume 1: Thermodynamics and Kinetics, 9th Edition, Peter Atkins and Julio de Paula or Physical Chemistry, 9th Edition, Peter Atkins and Julio de Paula
TA:	Kayl Overcast (kovercast@alaska.edu)

Course Description (from the UAF 2015-2016 catalog): Principles of thermodynamics and kinetics with applications to phase equilibria, solutions, chemical equilibrium and electrochemistry. Course teaches these concepts using both lecture and laboratory instruction. Special fees apply. Prerequisites: CHEM F106X; MATH F252X; PHYS F104X or PHYS F212X; or permission of instructor. (3+3)

Course Goal: Chemistry 331 is the first semester of a two-semester series in physical chemistry. The goal of the series is to provide you with a mathematical and physical understanding of why chemical and physical systems behave as they do. In 331, we will cover most of the book (Chapters 0, 1-6 and 20-23 in the full-year volume).

Learning Outcomes: In Chemistry 331, you will study equilibrium thermodynamics and chemical kinetics. We will apply these concepts to practical applications including chemical equilibria, solutions, electrochemical cells and complex reaction mechanisms. You will practice using these concepts to explain behavior observed in your weekly laboratory experiments. By the end of the course, you will have gained a new, physical and mathematical, understanding of thermodynamics and kinetics and be able to apply this understanding to solving quantitative problems.

Class Behavior: I expect all students to respect the rights of their classmates to learn in a safe and respectful environment. Please come to class on time and prepared to participate. Also, please turn off all electronic devices, such as cell phones, during class.

Grading: Your course grade will be determined by your combined scores on three one-hour exams, a final exam, laboratory reports, and homework. The point breakdown is as follows:

3 hour-long exams (100 points each)	300 points
Final exam (December 16th, 10:15 AM-12:15 PM)	100 points
Laboratory	140 points
Homework	100 points
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Total	640 points

The tentative grade scale is as follows:

576-640 points	A
512-575.9 points	B
448-511.9 points	C
384-447.9 points	D
<384 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 use +/- grading.

Each exam is worth ~16% of your grade. The exam dates are listed below.

October 2	Exam 1	Weeks 1-3
October 23	Exam 2	Weeks 4-6
November 20	Exam 3	Weeks 7-10

The exams during the semester are an hour in length and are on the information presented during the weeks listed above. The final exam is on Wednesday, December 16th, 2015, from 10:15 AM - 12:15 PM in NSF 165. It is two hours long and is cumulative, although it emphasizes the material covered after exam 3. The time (December 16th from 10:15 AM -12:15 PM) of the final exam has been set by the UAF Registrar. 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.

During the exams, you may use a non-programmable calculator and the front side of one half of an 8 ½" by 11" piece of paper with only formulas on it (no worked problems). It is my prerogative to check your formula sheet and make sure that there are only formulas on it. If your sheet contains other information on it, it will be considered cheating (see the Chemistry Department Policy on Cheating below). If you have any questions about what is acceptable to have on the sheet, check your sheet with me before the exam. Preparing your formula sheet will help you study for the exam, so it is in your best interest to make your own sheet and not copy someone else's sheet. I also will include a sheet of important constants, equations and a periodic table at the end of each exam, but my sheet of equations is so complete that it may be hard for you to find the equation you need when you are in a hurry during the exam.

Make-up exams will be allowed, if you have a good reason. Good reasons include: participating in UAF sporting events, unavoidable work conflicts, illness, family or personal difficulties, etc. However, you must let me know as soon as you learn of the conflict (sports or work) or as soon as is possible (illness, family or personal difficulties) and we will make arrangements for you to take a make-up exam.

Laboratory: An important component of Chem 331 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. Your final lab grade will be based on your participation in the laboratory, laboratory

notebook, and required pre- and post-lab work, including reports. A handout given during the first laboratory meeting will describe the grading procedures in detail.

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.

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.

Homework: There will be approximately weekly homework assigned for Chem 331. The homework assignments will be posted on the Chem 331 Blackboard site and announced in class. I recommend working with, not copying from, other students in the class when doing the homework. Working in a group facilitates learning and makes doing your P-chem homework a little less onerous. However, YOU need to work with the material to understand it and do well on the exams.

I will not accept late homework without arrangements being made prior to the due date or due to a documented illness or emergency. Turn in whatever you have completed by the deadline to receive some homework points instead of turning in a completed assignment late and receiving no points.

Blackboard: Chem 331 has a site on Blackboard (http://classes.uaf.edu/). On the site, you will find the syllabus, homework assignments, sample exams, exam and homework solutions, links to other sites, etc.

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. As a policy, I do not use Facebook, Twitter, text messaging, etc., to communicate with students, so please email me or call my office phone if you need to contact me.

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 are *examples* of cheating.

As a UAF student, you are subject to UAF's Student Code of Conduct
(http://uaf.edu/catalog/catalog_15-16/pdf/04_Academics.pdf, pp. 49-50) **including**:

"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/.

Physical Chemistry Survival Guide:

1. Go to class. – If you do not keep up with the class, you will have difficulty doing well on the exams and homework.
2. Read the lecture material before class. – You learn more when you see something for the second time. Also, you will be prepared to ask questions about topics that are confusing you.
3. Ask questions during lecture. – If you have a question, ask me. Someone else in the class probably has the same question.
4. Do your homework. – I cannot stress how important it is for you to do your homework! Exam questions will frequently be like homework questions. Also, the more you practice solving P-chem problems, the faster you will be at answering the questions on exams and the easier the exams will be.
5. Start your homework early. – The earlier you start, the more time you will have to ask me questions if you get stuck. I do not appreciate phone calls at midnight the night before the homework is due…
6. Ask for help! – If you have trouble with a problem, ask me, your TA, or one of your classmates as soon as you can. This gives you plenty of time to solve the problem before the homework is due.
7. Work other problems. – The more you practice, the easier it gets!
8. Expect to spend a lot of time on this class. – P-chem is a difficult class and it will take you a long time to understand the concepts and feel comfortable solving the problems presented in class or lab and on the homework. The more you study the material and practice solving problems, the easier the exams and homework will be.
9. Study the worked examples in the book. – The authors did not do these problems just for fun. These problems are designed to help you understand how to approach typical P-chem problems and will be very similar to the homework and exam questions.

10. Don't forget what we covered earlier in the semester. – Many of the same concepts will appear again and again throughout the class. Also, the final is cumulative, so you will want to keep the earlier material fresh in your mind.
11. Use dimensional analysis. – If your units did not work out, you have done something wrong.

Chemistry 331 **TENTATIVE SCHEDULE** **Fall 2015**

Date	Ch.	Topics	Event
Sept 4	0	Introduction	
Sept 7-11	1	Sept 7 – Holiday! Perfect and Real Gases	
Sept 14-18	2	1st Law of Thermodynamics – Basics and Thermochemistry	
Sept 21-25	2	1st Law of Thermodynamics – Thermochemistry and State Functions	
Sept 28-Oct 2	3	2nd Law of Thermodynamics – Spontaneous Change	Exam 1
Oct 5-6	3	Combining the 1st and 2nd Laws of Thermodynamics	
Oct 12-16	4	Phase Diagrams and Transitions	
Oct 19-23	5	Simple Mixtures – Properties and Phase Diagrams	Exam 2
Oct 26-30	5	Simple Mixtures - Activities	
Nov 2-6	6	Spontaneous Chemical Reactions	
Nov 9-13	6	Equilibrium Electrochemistry	
Nov 16-20	20	Molecular Motion - Gases	Exam 3
Nov 23-27	20	Nov 27 - Holiday! Molecular Motion - Liquids	
Nov 30-Dec 4	21-22	The Rates of Chemical Reactions and Reaction Dynamics	
Dec 7-11	22-23	Reaction Dynamics and Catalysis	
Dec 14		Review	
Dec 16		**Dec 16 – Final Exam (10:15 A.M. – 12:15 P.M.)**	Final Exam

Important Dates:

Last day to drop class (class not on record) and get 100% refund ..... Friday, Sept 18

Last day for student- or faculty-withdrawals ("W" on academic record).....Friday, Oct 30

Last day of instruction: ..... Monday, Dec. 14

Final exam: ..... 10:15 A.M.-12:15 P.M., Wednesday, Dec. 16