CHE 431 and PHY 531: Physical Chemistry I
Fall 2010, 3 credits

Class times: MWF 10:20-11:10, Bowers 151
Instructor: Dr. Karen Downey, Bowers 137
Office Hours: MW 11:15-12:30, M 2:45-4:15
753-5732, downeyk@cortland.edu
Office Hours: R 1:45-2:45

Instructor: Dr. Karen Downey, Bowers 137
Office Hours: MW 11:15-12:30, M 2:45-4:15
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Office Hours: R 1:45-2:45

Course Description
CHE 431 is the first semester of a two-semester series covering physical chemistry. In this semester, we will concentrate on thermodynamics and kinetics. Next semester, CHE 432 will focus on applications of quantum mechanics to chemistry, spectroscopy, and special topics.

Prerequisites:
General chemistry (CHE 222), second semester calculus (MAT 126 or 122 or 236 or equivalent), and physics (PHY 202). Strong algebra skills are essential; please review calculus as well! There may be a separate math techniques review session outside class hours, depending on your need and desire for it.

Textbook
Physical Chemistry (2nd edition) by Thomas Engel and Philip Reid
OR
Thermodynamics, Statistical Thermodynamics, & Kinetics (2nd edition), by Thomas Engel and Philip Reid
Note: this text is simply the first half of the larger, full-year Physical Chemistry text.

Course Structure
Most instruction will be in the lecture format, although sometimes we will have group discussions.

Homework: One assignment per chapter. Assignments will be made available on the course eLearning site. You are expected to check this daily.

Quizzes: In-class quizzes, 5-7 throughout the semester. For the most part, these will be unannounced!

Midterms: There will be two midterm exams, given the weeks of October 1 and of November 5. Exam dates will be announced/confirmed at least one week before the exams take place.

Final: The final exam will be on Tuesday, 14 December 2008 from 1:00 to 3:00 pm. Students will be allowed one sheet front and back with equations from the course (no written notes or definitions please). The exam will be comprehensive, but the majority of the questions will emphasize material in the second half of the semester.

What you will learn
Thermodynamics and chemical kinetics. The goal is to take discussions of thermodynamics and kinetics from previous classes (like entropy and free energy from freshman chemistry), put them on firm theoretical background, and see how they apply to some new situations.
Problem sets and Quizzes

The best way to learn physical chemistry is by **practicing**! This is why homework is so important to your success in this course. I will collect and grade the weekly homework assignments. You will be graded on both the final answer you give and the thought process used to arrive at the answer; therefore, it is vital that you show your work carefully. (If you are unsure if you’ve shown enough work, use the following guideline: if you find your old assignment one year after turning it in, you should be able to follow your solution without having to dig out your books or old notes.) Homework will be due in class on the due date. **Late homework may be handed in the following weekday for a 50% reduction in grade; homework received later will not be graded.** Occasionally, there will be a short quiz during the first third of the class period. Quizzes are closed-book, closed-note (calculator allowed). Material for the quizzes will come from lectures and assigned reading. No collaboration is allowed on quizzes or exams.

Policy on homework collaboration

Homework assignments may be long or difficult, and collaboration can be a great way to improve your understanding of the material. Because of this deeper understanding gained by working in groups, collaboration is encouraged. Please follow these guidelines if you choose to work in groups.

1. You may work together in small groups (not greater than three people) to discuss approaches and solutions to the homework problems.
2. You may **NOT** copy line-by-line someone else’s solutions, and you may **NOT** allow someone else to copy your work.
3. You must understand the problem solutions well enough so that you could rework the problem in its entirety on your own.

Policies on Exams

There will be two midterms and one final this semester. Exams will cover material in the lectures, assigned readings, and/or homework assignments. Stress will be on topics that are covered thoroughly in more than one of these media. Exam questions will include short-answer conceptual questions, mechanical “plug-and-chug” problems, and more complex multi-step problems. The exams will emphasize understanding a few principles and applying them to varied scenarios rather than memorizing multiple equations. You will be allowed to bring one side of one sheet of paper with formulas into each midterm and one sheet (front and back) into the final. You will be required to turn these sheets in with your exam.

Exam times will be announced at least one week before the exam is held to allow you to plan enough time to study for and attend the exam. Although the times will be chosen to avoid conflicts, conflicts for university-sponsored activities will be considered as long as I am notified **at least five days** before the exam date. If there is a conflict with taking the exam at the time given, let me know as soon as possible, and I will try to make alternate arrangements. If an emergency circumstance prevents you from taking an exam, please
notify me as soon as possible, and I will make every attempt to make alternate arrangements.

Evaluation
Final course grades will be assigned weighing the individual factors in the following way:

<table>
<thead>
<tr>
<th>Course</th>
<th>Quiz &amp; HW</th>
<th>Exam 1</th>
<th>Exam 2</th>
<th>Final</th>
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</thead>
<tbody>
<tr>
<td>CHE 431</td>
<td>30%</td>
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<tr>
<td>PHY 531</td>
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The base grading scale is as follows:
A >90%
B 80-90%
C 70-80%
D 60-70%
E <60%

The dividing lines between letter grades will not be changed upward; however, they may be moved to lower percentages, depending on the overall course performance.

For those taking a CHE or PHY 5xx
Those of you taking a 5xx-numbered course will write a term paper on a thermodynamically- or kinetically-oriented topic of your choosing. You will meet with me individually to discuss your paper topic. You must discuss your paper topic with me and get my approval on a topic before Friday, September 17 to leave yourself enough time for researching, writing, revising (aka rewriting), editing, and submitting your paper. Written communication on scientific topics must be both accurate and clear; the quality and clarity of your writing will be as important as the quality and accuracy of the information you report.

- Initial topic proposal by Sept 8
- Approvable topic proposal by Sept 17
- Detailed outline with annotated bibliography by Oct 18
- Draft 1 by Nov 5
- Final draft by Dec 6

Students majoring in Adolescence Education: Chemistry 7-12 will focus on acquiring knowledge and developing skills aligned with learning outcomes from the College's Conceptual Framework for Teacher Education and those established by the National Science Teachers Association. In particular, this course addresses Conceptual Framework Learning Outcome 2: Possess in-depth knowledge of the subject area to be taught; Conceptual Framework Learning Outcome 13: Demonstrate sufficient technology skills and the ability to integrate technology into classroom teaching/learning; NSTA Standard 1: Content; NSTA; Standard 2: Nature of Science; NSTA Standard 3: Inquiry; NSTA Standard 4: Issues; and NSTA Standard 7: Science in the Community.
Students with Disabilities
If you are a student with a disability and wish to request accommodations, please contact the Office of Student Disability Services located in B-1 Van Hoesen Hall or call (607) 753-2066 for an appointment. Information regarding your disability will be treated in a confidential manner. Because many accommodations require early planning, requests for accommodations should be made as early as possible.

Summary of available resources
I have several alternative textbooks in my office, if you feel you would benefit from reading the material as presented by other authors as well. Some of these texts are more mathematical, others more visual; some are very formally complete and others present more of an overview. I am willing to loan these books to those who would like extra resources. Come to office hours to discuss this. In addition, our eLearning course website will have links to review materials published online. Please come by office hours if you have any concerns at any time throughout the semester. This material can be both fascinating and challenging; I look forward to helping you master it.

The College is an academic community whose mission is to promote scholarship through the acquisition, preservation and transmission of knowledge. Fundamental to this goal is the institution’s dedication to academic integrity. Providing an atmosphere that promotes honesty and the free exchange of ideas is the essence of academic integrity. In this setting all members of the institution have an obligation to uphold high intellectual and ethical standards. Students must recognize that their role in their education is active; they are responsible for their own learning. Specifically, it is the responsibility of students to protect their own work from inappropriate use by others and to protect the work of other people by providing proper citation of ideas and research findings to the appropriate source. (SUNY Cortland Handbook, §340.01, Statement of Academic Integrity)

Course Schedule:
See our eLearning course website.
This schedule may be revised as the semester progresses, but it provides you with an idea of how important it is that you keep on top of the assigned readings.

Extra Credit:
Extra points to be applied to homework/quiz points can be earned by emailing summaries of class lectures/discussions to me using the eLearning course website email function.

1 point – brief, basic summary, may contain some inaccuracy but has the general gist
2 pts—brief, accurate summary that shows some insight
5 pts—brief, accurate summary that places day’s lecture in context of previous lectures, of previous coursework (gen chem., analytical chem., etc) or of assigned reading

Summaries must be sent within 24 hours of the class meeting being summarized. They should be no longer than one paragraph. This is the only mechanism by which extra credit can be earned.
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