

Thermodynamics, Equilibria, and Kinetics

Chem 260
Spring 2009

Class: MWF from 8:10-9:10 in JSC 375
Lab: T from 8:30-11:20 in JSC 359
Final Exam: Saturday, May 9, 8:30-11:30 AM

Professor: Sharon Crary
Office: Julian Science Center Room 328
Website: <http://academic.depauw.edu/~scrary>

Office hours:

I will post a sign-up sheet for reserving office hours outside my office door every week. Please fill-in your request for a time as far in advance of the meeting as possible. If you have course conflicts with all of the available times posted in any given week please contact me by email.

Course Goals:

In Chem 260 you will be introduced to the fields of physical chemistry and analytical chemistry. While we will not cover the breadth of these disciplines, this course will help you to comprehend the immense scope and power of these branches of knowledge and learning. At the completion of this course you will find that you have also developed a number of very specific abilities.

These will include the ability:

- to predict the favorability of chemical reactions
- to characterize the extent to which a chemical reaction occurs, and predict the system's final composition
- to evaluate a reaction's temporal feasibility
- to elucidate possible pathways for a chemical reaction
- to study reactions quantitatively in the laboratory
- to design, carry out, and evaluate experiments involving chemical reactivity
- to appreciate the importance of physical and analytical chemistry in other disciplines

In addition to these discipline-specific goals, we have several broader goals; these are:

- to appreciate the utility of developing models as predictive tools
- to learn how to think critically about conceptual or abstract ideas
- to improve your skills at solving problems
- to become more comfortable working and thinking in the laboratory
- to become more adept at responsibly and ethically evaluating and processing large amounts of information
- to gain experience working with others as part of a research team

Text:

The textbook for this course is *Chemistry: Structure and Dynamics* by Spencer, Bodner, and Rickard; you may use the 3rd or 4th edition of this text. The pages and problems referenced in the course schedule are from the 3rd edition. There is a copy of the 3rd edition on reserve in the

library if you need to cross-reference your text to it. Additional supplementary material is found in the provided course manual and on the course's web-site (see below).

Course Web-Site.

Archived copies of all course materials are available through the course's web site. The easiest way to reach the website, including any updated course schedule, is to go to the Chemistry Department website and look through the left column for the link to Chem 260. You can also access it through my website which can be found on the Chemistry Department faculty and staff webpage.

Grading:

Your understanding of the material covered in this class will be evaluated through exams, lab work, and quizzes.

Exams (70%) – Each of three one hour exams will be worth 14% of your final grade. The final is cumulative and will be worth 28% of your grade.

Laboratory (20%) – For more details refer to your lab manual. All lab work, including the reports, must be completed to pass this course.

Quizzes (10%) – There will be a short quiz at the beginning of class each Wednesday, except during an exam week. There will be no make-up quizzes.

Ideas for learning:

This course should serve not only as an introduction to a subset of chemistry, but also as one of many courses that will help you in developing your critical thinking skills. This will only be possible if you come to class prepared to think! It will therefore be absolutely necessary that you *read the relevant text material prior to class*. In addition, research shows that learning is enhanced through multiple exposures to material, so reading prior to class will ease the learning process for you. Likewise, *summarizing covered material immediately after class* forces you to think about what you learned and thus to internalize it.

You will also know you understand the material if you can discuss it, ask relevant questions, and summarize concepts verbally. For this reason, participation in class will be important. While your attendance and participation do not factor into your grade directly, they will be factors in situations involving letters of recommendation, research opportunities, and as a general indicator of student effort.

One way to assess your own understanding of the course material is to do problems. The course schedule includes problems that I consider to be helpful for sharpening your basic skills.

Completing these problems will ensure that you have the necessary knowledge of the material. Questions which are more challenging, and therefore more "exam-like", will be provided during class.

The Quantitative Reasoning Center

The Q-center is a valuable resource for *any* chemistry course at DePauw. Professor Martoglio, who is the head of the Q-center, is also a chemistry professor and therefore truly understands the needs of students in our department. The Q-center is located in Room 115, Asbury. You can find the tutoring schedule from the web site (<http://www.depauw.edu/admin/arc/Q-center/qconsult.asp>) and schedule appointments at x4039. You can also drop by the Q-center for assistance without an appointment.

Important policies:

1. Lab attendance and reports are mandatory. You must complete all laboratory work, including all laboratory reports, to receive a passing grade of D- or better.
2. Grades on a borderline may be moved up or down by a maximum of 1 point to account for intangible factors. Intangible factors that may affect your grade include, but are not limited to: a particularly strong or weak final exam, a steady improvement or decline in performance during the term, and a particularly strong or weak contribution to the class or lab. Such adjustments are not common.
3. All four course exams are mandatory. Be sure to see me well in advance of an exam to discuss your valid reason for needing a make-up exam.
4. Questions about grading must be held until one day after you have received graded material back from me. In addition, such questions must be posed to me within one week of receipt of the graded material. After this time, I will not be able to review graded material; as more time passes it becomes too difficult to remain maintain equality of grading between papers.

Academic integrity is the single most important point to me in any course. Scientific progress occurs only when ideas, experiments, and results are shared among the scientific community. This process depends absolutely on honesty and trust among scientists. We should be modeling such scientific and academic integrity whenever we are engaged in scientific pursuits.

Furthermore, academic dishonesty serves no educational purpose and is damaging to the entire class and to me. Please be sure you are familiar with the university's academic integrity policy as stated in your current *DePauw University Student Handbook*. If you choose not to talk to me about an ethical issue about which you have misgivings, I suggest that you err on the side of caution. There is really no such thing as being too honest when it comes to academics.

Academic Expectations for DePauw Students (from your handbook):

DePauw has considerably different academic expectations from those of high school and it is important that students adjust to these new expectations early in their college careers.

1. College is not the end of the educational process but a foundation for a lifetime of continued learning and growth. Therefore, one of the central goals of college is to help students develop a sense of responsibility for their own learning and the ability to learn on their own.
2. Accordingly, college students spend much less time in class than they did in high school but are correspondingly expected to do much more work outside class than they did in high school.

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3. Students should expect to spend between forty and fifty hours a week (or more) on their academics, the equivalent of a full-time job.
4. Students are responsible for learning a great deal of the material on their own outside of the classroom.
5. Students should expect that course material will be covered at a much more rapid pace than they have experienced before. This expectation is partially based on the assumption that students are preparing carefully for class so that more material can be covered in class.
6. Students are expected to come to class prepared and ready to participate actively in the class session. They are expected to have read the texts and used other required materials carefully and comprehensively before the class session.