**CHE 371: Thermodynamics and Kinetics** (Syllabus subject to change by instructor)
Fall 2009
Lecture: M T W F 9:00-9:50 am, NHS 305
Laboratory:
T 1:30-5:20 pm, NHS 107 (Section 3)
W 1:30-5:20 pm, NHS 107 (Section 4)
Th 2:30-6:20 pm, NHS 107 (Section 5)

**Instructor**

Dr. Steve Miller
Office: NHS 107B
Office Hours: T W 12:30 – 1:30 pm

While I will be available at these times each week, I am also happy to meet with students at other times. If you would like to see me outside of my office hours, it would generally be best to contact me in advance to arrange a time. You are also welcome to stop by my office, but be aware that I may not be there or I may be unable to see you if I am occupied with other obligations.

Phone: x7321
Email: **smiller3@gustavus.edu**

**Lab Instructors**

Dr. Steve Miller, Sections 3 and 4
Dr. Amanda Nienow, Section 5
Office: NHS 106C
Phone: x7327
Email: **anienow@gustavus.edu**

**Catalogue Description**

Required for the chemistry major. Topics include the gas laws and kinetic theory of gases, elements of classical and statistical thermodynamics, thermochemistry, chemical and phase equilibria, solutions and colligative properties, and chemical kinetics.

**Course Goals**

1) Understanding the laws of thermodynamics and their application to the study of chemical systems
2) Describing thermodynamic properties from a statistical foundation
3) Understanding reaction kinetics at a molecular level

**Required Materials**

Textbook: Atkins, de Paula and Friedman, *Quanta, Matter, and Change*, Freeman and Company (2009)
Lab manual: Gustavus Adolphus College, *Physical Chemistry Laboratory Manual* (available only through the campus bookstore)

**Attendence**

I do not take attendance for lecture. However, attending every lecture is strongly encouraged. If you miss a lecture, **you** are responsible for getting the information and/or notes covered in class from a classmate—I will not provide it for you. Moreover, you will probably find that what is *said* during lecture is no less important than what is written in your notes, and there is no reliable way to hear what is said without being in class and paying attention. Laboratory attendance **IS** required every week. If you must miss a laboratory meeting, please inform your lab instructor as soon as possible to discuss make up options.

**Grading**

Final grades will be assigned according to the following scheme:

| | |
|---|---|
| HW | 15% |
| Quizzes | 25% |
| Midterm Exams | 20% |
| Lab | 25% |
| Final Exam | 15% |

The maximum percentage for final grades will be 88% (A-), 76% (B-), 62% (C-), 55% (D), <55% (F). In other words, if you earn a grade of 91% for the semester, you are guaranteed an A/A-; if you earn 87%, you are guaranteed at least a B; with the final cutoffs your grade may be bumped up to an A/A- (the actual percentage cutoffs will be determined only after the final exam).

Note: different items may not be worth the same number of points (e.g. one quiz may be worth 25 points and another 47 points). However, I do all of my grading based on percentages, so 80% on a 25 point quiz affects your overall grade exactly the same as 80% on a 47 point quiz.

**Exams**

There will be two midterm exams given in class on/near the dates included in the attached schedule. You are expected to take each exam in class on the day it is given. If you know ahead of time that you will be unable to do so, you may arrange another time to take a make-up exam. If you are unable to take your exam because of a last minute problem (e.g. illness), you must contact me as early as possible (preferably before the exam). Make up exams in such instances will be allowed at my discretion depending on the reason for the missed exam. Be forewarned: make up exams may contain different (probably harder) questions than the exam given in class; it will therefore not be beneficial to you to see the exam given in class before taking a make up exam. Exams will be meant to require the full 50 minute class period, and will contain some combination of multiple choice, true/false, matching, short answer and word problems. I may also elect not to allow the use of calculators on exams.

You may write in either pen or pencil on exams. However, I will not regrade any problems on an exam which is written in pencil, erasable pen, or pen which has been whited out. (If I make an adding mistake when totaling an exam grade, I will fix it whether the exam was written in pen or pencil.)

**Quizzes**

In class quizzes will be similar to exams, only shorter (~30 minutes each); quizzes may alternately be given as take home assignments. There will be five quizzes given throughout the semester. The policy for quizzes is the same as that for exams (with regards to make ups, calculators, etc.). No make up quizzes will be given, but you will be allowed to drop your lowest quiz score.

**HW**

Seven homework assignments will be given during the semester. Due dates for assignments are given in the attached schedule; late assignments will not be accepted under any circumstances. The assignments will be designed to keep you current with the course material and provide insight into the types of problems which you are most likely to see on quizzes and exams. Also, note that HW is a significant contributor to your course grade (15%–the same as the final exam!). It is very much in your best interest to complete the assignments and understand the material covered in them!

**Laboratory**

Each student must attend every lab session and complete all of the required laboratory assignments in order to pass the course as a whole. In addition, lab contributes 25% to your overall course grade. The laboratory portion of the course is designed to apply the theory of thermodynamics and kinetics to real experiments. Lab grades will be based on notebooks, written lab reports, and one group presentation; more will be said about lab grades and expectations during the first lab meeting.

**Final Exam**

All students must take the final at the time/place (NHS 305, Thursday Dec. 17, 10:30-12:30) mandated by the college. The policy for the final exam will be the same as that used for the midterm exams and quizzes.

**<u>General Expectations</u>**

1) I will try to treat every student with respect. In return, I expect each student to treat me and all of his/her fellow students with respect. This includes not talking during lecture or when others are speaking. For my part, I will start and finish class on time.
2) We will be using cell phones in class on occasion; you are encouraged to bring them and participate in activities making use of them. However, *phones should be kept off (not just in silent/vibrate mode) at all other times.*
3) I expect you to be honest, as per the personal code of conduct each GAC student is required to sign when registering for classes. If you have any questions/concerns about the

propriety of a particular aspect of working with your fellow students, please do not hesitate to discuss it with me. **Academic dishonesty will not be tolerated under any circumstances.** Anyone caught cheating will receive an automatic grade of zero for the assignment/lab/quiz/exam in question. A second offence will result in the student's immediate removal from the course, an automatic F grade for the course, and referral to the dean of students.
4) If you ever have questions, ask! If I can not answer them myself, I will try to point you to someone who can.

**Tips for Success**
1) **Do not wait until the night before a quiz or exam to study.** Physical chemistry is built on a variety of abstract, conceptual ideas; it is, nonetheless, quite math intensive. It is a very difficult subject to learn it in a hurry!
2) **Do the homework.** The homework assignments are meant to help you keep pace with the lecture material and avoid falling behind. In addition, doing the homework should be a reliable way of boosting your course grade.
3) **When reading the textbook, re-read any passages which you do not understand.** If you see a word you do not know, look it up in a dictionary. It can also very helpful to write a summary of material you have just finished reading.
4) **Take good notes.** Thermo is a difficult course to study for without the guidance of a good set of notes. Also remember that I will not test you on any material which I do not cover in lecture.
5) **Come in for help if/when you need to.** I try to be available as much as possible, and do not mind lending a helping hand if need be!

**Additional Resources:**
I will post lots of things on the class website over the course of the semester:
homepages.gac.edu/~smiller3/courses/371-f09.htm
If ever you need to find some information (lab handouts, homework assignments, etc.) check there first, and let me know if you can not find what you need.

*Disability Services:* Any student who has a physical, psychiatric/emotional, medical, learning, or attentional disability that may have an effect on the his/her ability to complete assigned course work should contact the Disability Services Coordinator (Laurie Bickett, lbickett@gustavus.edu or x6286) in the Advising Center, who will review the concerns and decide with the student what accommodations are necessary.

*Help for students whose first language is not English:* The Writing Center has a part-time tutor with professional training in ESL/ELL instruction on staff. Students can schedule work with this tutor by contacting the Writing Center. Students may bring their instructors documentation concerning their ELL status.