Physical chemistry is the study of the interaction of energy and matter. Topics covered typically include kinetic theory of gases, intermolecular forces, thermodynamics (i.e., the application of enthalpy, entropy, and free energy to chemical equilibrium, phase equilibria, and electrochemistry), and statistical mechanics. The course is intended primarily for chemistry, biochemistry, environmental science, and chemical and biochemical engineering majors. The course requires use of differential and integral calculus and skill in mathematical problem solving.
Course Content

- Introduction of Thermodynamic Variables
- Equations of State
- 1st Law of Thermodynamics
- Heat Capacities
- Enthalpy
- Applications of the 1st Law
- 2nd Law of Thermodynamics
- Entropy
- Free Energies
- Thermodynamic Formulae
- Phase Transitions
- Mixtures
- Chemical Equilibrium
- Probability and Statistics
- Statistical Thermodynamics

Grading

Exam 1, Tuesday, September 20, 6:30-8:30 PM (W128 CB) 15%
Exam 2, Tuesday, October 18, 6:30-8:30 PM (W128 CB) 15%
Exam 3, Tuesday, November 15, 6:30-8:30 PM (W128 CB) 15%
Problem Sets, approximately 1 per week 35%
Final Exam (date, time, and room TBA) 20%

A Word about the Date and Time of the Final Exam: The final examination date and time will be announced during the first half of the semester by the Registrar. I will announce the final examination date and time for this course at the course ICON site once it is known. Do not plan your end of the semester travel plans until the final exam schedule is made public.

The distribution of grades will be consistent with the College of Liberal Arts and Sciences recommended distribution for an advanced course:

22% A, 38% B, 37% C, 3% D, 1% F.

If you have questions about your grade status, please see an instructor during office hours or by appointment.

Final grades will use + and - designations, with A+ reserved for exceptional cases.
Since course exams are held in the evening outside of regular class time, three lectures will be canceled during the semester to compensate. The specific dates of these canceled lectures will be announced in class and posted on ICON. Discussion sessions may also be canceled during exam weeks.

Regrades If you want any of your work (problem sets or exams) considered for regrading, you must bring it to our attention within a week of when the assignment/exam is returned. In addition, you must, on a separate sheet of paper, clearly state why you want your work considered for regrading. This explanation should include a re-working of the problem in detail, with your notes on where and why you think more points should be awarded. An exception to this rule is if you think your points are simply mis-added, in which case you still must bring your paper to an instructor within a week of the return date but you are not required to write up an explanation sheet.

The prerequisites for this course include calculus and elementary physics. I will make every effort to introduce important mathematical and physical concepts before they are used in class, but these elements are an essential part of physical chemistry. You will be expected to master and apply the necessary mathematical methods to be successful in this course.

This is a 3 credit hour course, so under University policy you should expect to spend six hours per week outside of class on activities related to this course.

Attendance
Attendance is expected. If you must miss class on an assignment due date or on an exam date, you must complete an Explanatory Statement of Absence form. These forms are available through the University Registrar. (http://registrar.uiowa.edu/)

Cell Phones and Personal Electronic Devices
Use of cell phones and other personal electronic devices is not allowed during class. I give lectures using the whiteboard, not PowerPoint, and if you wish to take notes, you are to write them down. As we use a great deal of symbolic math, and also sketch plots, it is not typically practical to take notes electronically. Note that use of your phone or other devices during class is grounds for you to be asked to leave for the remainder of the lecture. I may also decline to grade any work (including problem sets) collected on a day in which I observe you using your cell phone or other device during class.
Make-Up Exams
If you are ill or a personal emergency makes it impossible to be present for a scheduled exam, please contact an instructor as soon as possible. If you are aware of a conflict in advance, it may be possible to take the exam early. Permission to take a make-up exam will require an Explanatory Statement of Absence.

Timely Completion of Assignments
Problem sets turned in late will not be accepted for a grade without a completed Explanatory Statement of Absence. All problem sets are due at the beginning of class on the date noted on the assignment. On the days that assignments are due, a folder will be placed in the front of the lecture room for you to turn in your solutions. That folder will not be available after class begins, and late assignments may be penalized or refused for grading as the instructor sees fit. You are responsible for turning in your own work. If you are observed handing in an assignment but not staying for lecture, your work will not be graded unless the absence is excused as detailed above under Attendance. If you are observed handing in work for another student who is absent without an excuse, neither your paper or theirs will be graded.

Expectations for the Completion of Problem Sets
The problem sets are an integral part of this course. If you miss turning in 4 or more problem sets, you will automatically receive a failing grade (F) for the course, regardless of your standing otherwise. The only exception to this policy is if excused absences interfere with problem set due dates, and in such cases absences must be accounted for as detailed in the section on Attendance. You can discuss the problem sets with your peers. However, copying work is not discussion. All written work must be individually prepared. Work that is copied from another student is not acceptable. Please see the section in the Student Academic Handbook on Rights and Responsibilities for University policy on academic misconduct.

When answering a question, one needs to know the audience for the answer. In preparing problem set solutions, direct your answers towards a classmate who is “somewhat behind” you in terms of studying. Your solutions to each problem set should be detailed enough to serve as a study aid to another student in class whose understanding of the materials is less proficient than your own. Err on the side of explaining a little too much, or showing a bit too much work. Also be sure that your solutions are easily readable and that you use the same symbols/notation as used in class and in the text. This will ensure that you receive optimal point credit for your solutions. SEM will personally grade a portion of each problem set and will review the quality of your solutions. You will be given feedback, if necessary, on the quality of your problem set solutions. If you fail to address that feedback in subsequent assignments, you will lose points accordingly.
In-Class Problems, or “Pop Quizzes
Throughout the semester, I will give short in-class problems which you may think of as pop quizzes. Typically, these problems will be given at the start of class, and ≈2-5 minutes will be given to complete them. The points given for in-class problems will count towards the problem sets.

Problem Set “Bonus Point” Opportunity
You can earn up to 50 “bonus points” to apply towards your problem sets by attending up to two chemistry seminars in which the speaker presents on a physical chemistry topic. By “physical chemistry topic,” I broadly mean any concept or method covered in any chapter of the course textbook, and thus I am not confining the topics to material explicitly covered in this course. Seminars are advertised throughout the chemistry building on flyers, and the schedule can also be found online through the department website. In order to earn these bonus points, you must attend the seminar and also provide me with a one page write-up within one week of the seminar date. Your write-up must include the speaker’s name, affiliation, and a list of their degrees (including from what schools). You should then do your best to summarize the seminar in a paragraph or so. Finally, you must then write a paragraph or so in which you describe how the seminar relates to a topic in physical chemistry. You can/should refer to the speaker’s professional website to complete your write-up. Each write-up will earn up to 25 problem set points that I will apply towards your grade.

Safe Zone Statement
I am part of the Safe Zone Project community network of trained University of Iowa faculty/staff/students who are available to listen and support you in a safe and confidential manner. My goal is to help you be successful and to maintain a safe and equitable campus. The purpose of the Safe Zone Project is to identify members of the University community who will model support, affirmation, and inclusion of LGBTQ people. Participants who complete this program are choosing to be visible allies and to be trained to be effective resource people for their workplace and classroom.

I want to emphasize again that if you have any questions or concerns, please communicate those to me so that I can help you. I am available and I will be happy to talk with you.
Administrative Home
The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at http://clas.uiowa.edu/students/handbook.

Electronic Communication
University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. (Operations Manual, III.15.2. Scroll down to k.11.)

Accommodations for Disabilities
A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor’s office to make particular arrangements. See http://sds.studentlife.uiowa.edu/ for more information.

Academic Honesty
All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College’s Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies Handbook).

CLAS Final Examination Policies
The final examination schedule for each class is announced by the Registrar generally by the fifth week of classes. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar’s web site and will be shared with instructors and students. It is the student’s responsibility to know the date, time, and place of a final exam.

Making a Suggestion or a Complaint
Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident (CLAS Academic Policies Handbook).
Understanding Sexual Harassment
Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Office of the Sexual Misconduct Response Coordinator for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather
In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Department of Public Safety website.

*These CLAS policy and procedural statements have been summarized from the web pages http://www.clas.uiowa.edu/ of the College of Liberal Arts and Sciences and The University of Iowa Operations Manual.