4:131 Physical Chemistry  
Fall 2011

Instructor: Christopher M. Cheatum  
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Teaching Assistants: Lahiru Wijenayaka, Thilini Rupasinghe

Lecture: 8:30-9:20 Monday, Wednesday, and Friday in room W228 of the Chemistry Building

Discussions: Tuesday 4:30-5:20 C139 PC or Wednesday 3:30-4:20 C139 PC

Office Hours: 9:30-10:30 Monday and Wednesday, 1:30-2:30 Thursday, or by appointment


Website: http://icon.uiowa.edu

Course Objectives:  
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:
Review of Mathematics  
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  
Thermodynamics Formulae  
Phase Transitions  
Mixtures  
Chemical Equilibrium  
Probability and Statistics  
Statistical Thermodynamics
Grading:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Location</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>February 14, 2011</td>
<td>106 GILH</td>
<td>15%</td>
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<tr>
<td>Exam 2</td>
<td>March 21, 2011</td>
<td>106 GILH</td>
<td>15%</td>
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<td>Exam 3</td>
<td>April 18, 2011</td>
<td>106 GILH</td>
<td>15%</td>
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<tr>
<td>Problem Sets</td>
<td>Approximately 1 per week</td>
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<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>Friday, May 13, 2011 (TBA)</td>
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<td>25%</td>
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The distribution of grades will be consistent with the College of Liberal Arts and Sciences recommended distribution for an advances course:

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

Final grades will use +/- designations. A+ will be reserved for only the most exceptional cases.

Course Policies and Procedures:

Prerequisites and Required Background Material

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

Expected Student Workload

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.

Make-Up Exams

If you are ill or a personal emergency makes it impossible to be present for a scheduled exam, please contact me as soon as possible. If there is a conflict with an exam time that you are aware of in advance, it may be possible to take the exam early depending on the nature of the conflict. Permission to take a make-up exam will require an Explanatory Statement of Absence which is available at the Registration Center, 30 Calvin Hall.

Timely Completion of Assignments

Problem sets turned in late will not be accepted for a grade. Unless otherwise noted, all problem sets are due at the beginning of class on the date noted on the assignment. Please turn in your solutions before the lecture begins.

CLAS Policies and Procedures:

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 Student Academic 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 privately with the course instructor to make particular arrangements. See [www.uiowa.edu/~sds/](http://www.uiowa.edu/~sds/) for more information.

**Academic Fraud**
Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Undergraduate Programs and Curriculum. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Academic Fraud section of the Student Academic Handbook.

**CLAS Final Examination Policies**
Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the Associate Dean for Undergraduate Programs and Curriculum.

**Making a Suggestion or a Complaint**
Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic 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 Comprehensive Guide on Sexual Harassment 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 Public Safety web site.

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

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.