Instructor: Professor Sarah Larsen  
Office: W176 CB  
Phone: 335-1346  
E-mail: sarah-larsen@uiowa.edu  
Office Hours: WF 10:15 - 11:45 AM. Additional times are available by appointment.

Course Objectives and Overview: This course covers both chemical kinetics (e.g., rates laws, mechanisms) and the fundamental principles and applications of quantum mechanics in modern chemical science (e.g., quantum models, periodicity, bonding, spectroscopy). Students will discover how empirical reaction rates and molecular based models can be used to gain insight into both simple and complex chemical systems. Students will learn the fundamental principles of quantum mechanics that govern molecular structure and bonding and then will further apply their knowledge to develop an understanding of how spectroscopy can be used to probe molecular systems.

Course Structure: Chem 4:132 consists of lecture and discussion section. Attendance is expected at both course components.

Lecture: Monday, Wednesday, Friday 8:30-9:20 AM in W228 CB

Discussion Sections: Monday 5:30-6:20 PM in E215 CB and Tuesday 1:30-2:20 PM in E215 CB. Discussion Sections are a complement to lectures. Students ask questions and gain problem-solving experience. Attendance is expected. At times, short quizzes may be given in lecture and/or discussion section. Discussion sections will not meet the first week of classes (week of Aug. 23).

Teaching Assistants: Discussion Section-Ying-Hua Chung (email: ying-hua-chung@uiowa.edu) and Grader- Aruni Gankanda (email:aruni-gankanda@uiowa.edu)

Course Prerequisites: 004:012 (CHEM:1120) or 004:019 (CHEM:1190), 029:012 (PHYS:1512) or 029:082 (PHYS:1612), and 22M:026 (MATH:1860) or 22M:032 (MATH:1560).

Text and Materials:
(1) Physical Chemistry, 9th edition (preferred), by Atkins and DePaula (required)
(2) Accompanying Student Solution Manual (optional)

Web Page: Chemistry 4:132, Iowa Courses Online (ICON) website URL = http://icon.uiowa.edu/. Use your HawkID and HawkID password to log in to ICON.

Topics Covered: Topics covered in this course include chemical kinetics, quantum mechanics, atomic and molecular structure and molecular spectroscopy. An overview of the topics and the corresponding chapters in the textbook are given below.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Topic</th>
<th>Chapters (Atkins 9th ed.)</th>
<th>Chapters (Atkins 8th ed.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>Chemical Kinetics</td>
<td>21, 22, 23</td>
<td>22, 23, 24, 25</td>
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<tr>
<td>Unit 2</td>
<td>Basics of Quantum Mechanics</td>
<td>7, 8</td>
<td>8, 9</td>
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<tr>
<td>Unit 3</td>
<td>Atomic &amp; Molecular Structure &amp; Molecular Symmetry</td>
<td>9, 10, 11</td>
<td>10, 11, 12</td>
</tr>
<tr>
<td>Unit 4</td>
<td>Spectroscopy</td>
<td>12, 13, 14</td>
<td>13, 14, 15</td>
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Course Communication: Routine announcements will be made using one of the following mechanisms: class time announcement, handouts (electronic or paper), email or posting on the ICON website. Correspondence concerning the course may be sent to students by electronic mail using the official University e-mail address (firstname-lastname@uiowa.edu) as listed on the class roster. Each student is considered to be responsible for information contained in messages sent to their official UI e-mail address.

Grading: Semester grades will be based on three exams, a cumulative final exam, homework, and quizzes as outlined below:

- 3 Exams (100 pts each) = 300 pts.
- Final Exam = 150 pts.
- Homework and quizzes = 250 pts.

**Total** = 700 pts.

It is expected that the undergraduate distribution of grades will be similar to previous semesters. The target distribution is consistent with the grade distribution recommended by the College of Liberal Arts for advanced undergraduate courses (mean GPA=2.77). Plus/minus grades will be assigned. If you feel that an error was made in the grading of homework/quizzes or exams, you may request a regrade by notifying the instructor or the TA within one week of receiving the graded material.

Examinations: There are three exams and a cumulative final exam. Students should bring a #2 pencil, their University ID, and a basic scientific calculator, such as a TI30X or TI30Xa, to each exam. Graphing calculators, programmable calculators, or data transmitting devices (e.g., PDA, laptop, cell phone) will not be allowed in the examination room. Exam rooms will be announced in class and posted on the ICON website.

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Time</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Tues., Sept 21</td>
<td>8:00-10:00 PM</td>
<td>W128 CB</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Tues., Oct. 26</td>
<td>8:00-10:00 PM</td>
<td>W128 CB</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Tues., Nov. 30</td>
<td>8:00-10:00 PM</td>
<td>W128 CB</td>
</tr>
<tr>
<td>Final</td>
<td>Wed., Dec. 15</td>
<td>2:15-4:15 PM</td>
<td>TBA</td>
</tr>
</tbody>
</table>

No lecture class will be held on the day following an exam. Exams will not be rescheduled to accommodate holiday or other travel plans.

Make-Up Examinations: If an exam is missed due to an illness, family emergency, or other university recognized excuse, written documentation must be submitted to the instructor no later than one week after the missed exam. Excused absence forms are available in the Chemistry Center E225 CB.

Homework and Quizzes: There will be ~7-9 graded homework assignments due at the beginning of class on the date due. You must not copy work that is turned in for a grade (see academic misconduct policy). You can discuss the homework problems, but please remember that the written work must be your own. Late assignments will be accepted with a point penalty. The homework and quizzes are subject to the same re-grade policy as for examinations, as described above. Quizzes may be given without prior notice.
The College of Liberal Arts and Sciences: 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 (http://www.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 privately with the course instructor to make particular arrangements. See 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 (http://www.uiowa.edu/~eod/policies/sexual-harassment-guide/index.html) 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 (http://www.uiowa.edu/~pubsfty/intlinks.htm).

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