Syllabus

Principles of Physical Chemistry (CHEM:4430)       Fall 2022

Instructor: Prof. Alexei V. Tivanski
Office: E272 CB; Phone: 319-384-3692
Office Hours (in-person): M 9:30 - 11:00 AM & W 9:30-11:00 AM, Room E272 CB, or by appointment via email:
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Department of Chemistry Contact Information: Students in need of additional information may contact staff in the Chemistry Center (231 CB or phone: 335-1341) during normal business hours.

Lecture: CHEM:4430:000A MWF: 11:30 AM - 12:20 PM, Room: W55 CB

Delivery mode: lectures are going to be in-person.
Lecture notes for each lecture will be posted (typically on the same lecture day) on the ICON course website. I strongly believe in active learning, so if you can please attend.

Class Rules: When you are attending in person, you are encouraged to wear a mask in public spaces, including campus buildings. If you are sick, please stay home. UI has rules on attending in person, familiarize yourself with them: https://coronavirus.uiowa.edu/returning-campus

Course Materials: Course Website: CHEM:4430 – Iowa Courses Online: https://icon.uiowa.edu/
Suggested Textbook: Student Solutions Manual by C. Trapp to accompany the textbook.

Objectives: Physical chemistry is the study of the interaction of energy and matter. This course covers elementary thermodynamics, principles of kinetics and catalysis, and selected topics in quantum mechanics and spectroscopy with emphasis on applications of chemistry to areas of science including biosciences, materials sciences, environmental sciences, and related areas.

Discussion Sessions: A teaching assistant will conduct in-person discussion sessions at the times listed below. This provides a good opportunity to have questions answered, work assigned problems, and to have concepts explained from a different perspective. Points are awarded for attendance & participation (up to three points) in discussion section activities, up to a maximum of 30 points during the semester. Discussion sessions do not meet formally the first week of classes (Aug. 22-26). No attendance points will be awarded during the first week of classes. For absences due to illness or other University-sanctioned excuses, students wishing to make up a missed discussion have one week from the time of their absence to contact their discussion TA and arrange attendance in a different section. You should be registered for only one discussion session.
Exams: There will be **three midterm exams** of equal weight (100 points each). There will be **one take-home final exam** worth 150 points, that will be cumulative but with emphasis (~50%) towards last quarter of the course material, focusing on quantum mechanics and spectroscopy. Make-up exams will be given only for excused absences or documented medical reasons. Please contact Prof. Tivanski (alexei-tivanski@uiowa.edu) before the missed exam.

Exam #1:  September 15, Thursday, 6:30 PM – 8:00 PM W128 CB  
Exam #2:  October 13, Thursday, 6:30 PM – 8:00 PM W128 CB  
Exam #3:  November 10, Thursday, 6:30 PM – 8:00 PM W128 CB

**Take-home final exam:** details will be provided later on the ICON course website.

**Homework:** Four graded homework assignments (50 points each) will be given during the semester. Homework may be discussed, but all written work must be performed independently. Note: homework assignments must be submitted in class. If you cannot make the lecture when the homework is due, then you may either arrange for your fellow student to submit on your behalf or send your homework **before the lecture** via email (alexei-tivanski@uiowa.edu) as a single PDF file. The answer key will be posted online after the lecture; **hence we will not be able to accept late homework.**

**Attendance:** This course is demanding; we will cover a large amount of material this semester. Lectures and discussion sessions are the most time-efficient approach to be able to keep up with the flow of the course.

**Grading System:** The following grade distribution chart (recommended by CLAS) will be used: A(22%), B(38%), C(36%), D(3%), F(1%) with average GPA = 2.8 out of 4. Plus & minus grades will be also awarded.

The homework, exams, and final exam will be weighted in the following manner:

- 4 homework assignments at 50 points each: 200 points (30%)
- 3 midterm exams at 100 points each: 300 points (44%)
- 1 take-home cumulative final exam at 150 points: 150 points (22%)
- Discussion participation/activity: 30 points (4%)
- Total: 680 points (100%)
Course Contents: We will cover much of the material in the textbook covered in 4431/4432 (Pchem I/II). Problem solving is an important component of the learning process. Accordingly, you are expected to work (at a minimum) the problems that will be assigned from each chapter. These assigned problems will be graded and returned to you. The problems are representative of the type you will find on exams.

The chapter coverage follows:

HW#1 & Exam #1:
- Ch 1: The properties of gasses
- Ch 2: The First Law

HW#2 & Exam #2:
- Ch 3: The Second and Third Laws
- Ch 4: Physical transformations of pure substances

HW#3 & Exam #3:
- Ch 6: Chemical equilibrium
- Ch 20: Chemical kinetics

HW#4 & Take-home cumulative final exam:
Cumulative: Approximately half of the final exam questions will be based on Exams 1,2,3 and another half will be based on the following two chapters
- Ch 7: Introduction to quantum theory
- Ch 8: The quantum theory of motion

For each semester hour credit in the course, students should expect to spend at least two hours per week preparing for class sessions (averaged over the entire semester).
Policies:

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 Academic Policies Handbook at [http://clas.uiowa.edu/students/handbook](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,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 [https://sds.studentlife.uiowa.edu/](https://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 tenth day 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 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 Department of Public Safety website.