CHEM:44321:000    PHYSICAL CHEMISTRY I SPRING 2019

INSTRUCTOR: Prof. Claudio J. Margulis

Office: 244 IATL
Phone: 335-0615
Office Hours: MWF 9:25-10:15 AM in 244 IATL. All other meetings are by appointment only.
E-mail: claudio-margulis@uiowa.edu

TA/Grader: Kevin Robben and Waruni Karunaratne
Phone: Waruni: 319-335-1872, Kevin:
Office Hours: Waruni: T,W 5:30-6:30 PM, Kevin: Th,F 11:30AM-12:30PM (E208 CB)
All other meetings are by appointment only.
E-mail: warunivindhya-hapuarachchigedona@uiowa.edu, kevin-robben@uiowa.edu

LECTURES: 8:30A - 9:20A MWF W181 PBB. Attendance is mandatory (I often check for attendance and consider both attendance and participation in class for your overall grade).

PROBLEMS SECTION: 8:30A - 9:20A T E215 CB and 5:30P - 6:20P W E203 CB. Attendance is mandatory (the TA often checks for attendance). These sessions are provided to assist you, so take advantage of the opportunity to discuss any questions concerning lecture material, problems from your text or exam question material.

COURSE DESCRIPTION: This course will cover the subject of chemical thermodynamics, including the concepts of heat and work, chemical equilibrium, solutions and an introduction to statistical mechanics.

1) To prepare and be successful for the close book tests, you must become proficient in solving problems and understanding the underlying theory behind them.

2) Sometimes a particular topic is more clearly explained in one book than in some other. Read other textbooks if you have trouble understanding a particular concept from the required class textbook. A list of other books on the topic appears later on this syllabus.

3) This course is demanding: we will cover a large amount of material this semester. You must spend enough time to keep up with the lectures. If you fall behind it will be very hard to catch up because topics are interconnected. You will not be able to study for this class the night before an exam and expect to do well.

4) As calculus is a prerequisite for this class, knowledge of calculus will be assumed. If you find that you are having trouble with the math consult a calculus text book.
Basic concepts of linear algebra and differential equations may be taught and used in class in order to understand the material. Students are expected to learn and use these tools.

TEXT AND MATERIALS:

Thermodynamics, Statistical Thermodynamics, & Kinetics. Fourth Edition Thomas Engel and Philip Reid

Optional physical chemistry books that you might find useful at times (not required):

- Physical Chemistry, Atkins
- Physical Chemistry, Ira N. Levine
- Physical Chemistry, Silbey and Alberty (I like this one)
- Physical Chemistry, Castellan
- Physical Chemistry, Berry, Rice and Ross

Many other excellent physical chemistry books exist. Please check with the library.

More advanced books on thermodynamics and statistical mechanics (more mathematics is required to read these, but the reward is that concepts will become clearer)

- Thermodynamics and an introduction to thermostatistics, Herbert B. Callen
- Statistical Mechanics, Terrence Hill
- Statistical Mechanics, Donald McQuarrie
- Introduction to modern statistical mechanics, David Chandler

Please use the library to your advantage.

GRADING: The final course grade will be based on the following components:

- Problem sets 12%
- Attendance/Participation 3%
- 3 Exams: 20% each (total 60%)
- Final: 25%

While the distribution of grades will generally be similar to that of previous semesters, variations between classes are common. Plus/minus grades will be assigned within each range.

EXAMINATIONS: There will be 3 exams and a comprehensive final. Exams are closed-book. Exams will be held in 106 GILH on the following Tuesdays between 6:30PM - 8:30PM: 09/17/2019, 10/15/2019 and 11/12/2019. The final is comprehensive (i.e. covers all the material studied). See CLAS Final Examination Policies section below for information regarding scheduling of the final.
For each exam, emphasis will be placed on material covered since the preceding exam, however it is very important to understand that the material covered later in the course requires the application of concepts learned earlier. Announcements will be made in class regarding the material to be covered on each exam. All exams will require you to be able to solve problems. All exams must be written in ink, but not red or erasable ink. Exams on which white-out was used or exams written in pencil, red or erasable ink will not be regraded. Exams will be graded as soon as possible. I will attempt (this is not guaranteed) to give you a lecture day off for every exam you must attend. The day off will not necessarily be the one following the exam.

Make-up exams must be arranged with the instructor and are only available in the event of a University recognized excuse (e.g. a documented medical emergency). Under no circumstances will a make-up exam be given to take the place of a regular exam taken earlier.

If you feel that an error was made in the grading of an exam, you may request a re-grade by notifying the instructor within one week of receiving the graded material. The request should be in writing and indicate the section of the exam that is in question. Please note that the entire examination will be subject to a regrade. No regrades after one week.

HOMEWORK: There will be weekly (or otherwise announced) graded problem sets. Unless otherwise announced in class, a problem set will be due in class exactly one week after it was assigned (i.e. If the homework is assigned on Monday it will be due the following Monday, if it is assigned on Wednesday it will be due the following Wednesday, and if it is assigned on Friday it will be due the following Friday). Late assignments and assignments submitted by email will not be accepted. The homework assignments must be securely fastened with a staple. The problem sets are subject to the same regrade policy as for examinations, as described above.

A NOTE ON COLLABORATION

Homework in this course is assigned to better prepare you for the closed-book exams. In this spirit, brainstorming sessions and collaborative work in order to figure out how to solve problems is highly encouraged and not penalized. However, after these collaborative sessions are finished, I expect each of the participants to independently write in their own words (and equations) the solutions for the assigned problems. This is the only way to make sure you fully understood what was discussed collectively. Identical or nearly identical assignment solutions are not acceptable.

College of Liberal Arts and Sciences: Policies and Procedures. Insert From:
https://clas.uiowa.edu/faculty/teaching-policies-resources-syllabus-insert

Administrative Home
The College of Liberal Arts and Sciences (CLAS) is the administrative home of this
course and governs its add/drop deadlines, the second-grade-only option, and other policies. These policies vary by college (https://clas.uiowa.edu/students/handbook).

**Electronic Communication**
Students are responsible for official correspondences sent to their UI email address (uiowa.edu) and must use this address for all communication within UI (Operations Manual, III.15.2).

**Accommodations for Disabilities**
UI is committed to an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as mental health, attention, learning, vision, and physical or health-related condition) by registering with Student Disability Services (SDS). The student should then discuss accommodations with the course instructor (https://sds.studentlife.uiowa.edu/).

**Nondiscrimination in the Classroom**
UI is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University’s Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity at diversity@uiowa.edu or diversity.uiowa.edu.

**Academic Integrity**
All undergraduates enrolled in courses offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty. Misconduct is reported to the College, resulting in suspension or other sanctions, with sanctions communicated with the student through the UI email address.

**CLAS Final Examination Policies**
The final exam schedule for each semester is announced around the fifth week of classes; students are responsible for knowing the date, time, and place of a final exam. Students should not make travel plans until knowing this final exam information. No exams of any kind are allowed the week before finals. (https://clas.uiowa.edu/faculty/teaching-policies-resources-examination-policies.)

**Making a Complaint**
Students with a complaint should first visit with the instructor or course supervisor and then with the departmental executive officer (DEO), also known as the Chair. Students may then bring the concern to CLAS (https://clas.uiowa.edu/students/handbook/student-rights-responsibilities).

**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 must uphold the UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must be reported immediately. For assistance, definitions, and the full University policy, see https://osmrc.uiowa.edu/.

(End of insert)
From the Code of Student Life

Student Classroom Behavior

When disruptive activity occurs, a University instructor has the authority to determine classroom seating patterns or require that a student exit the classroom, laboratory, or other area used for instruction immediately for the remainder of the period. Instructors who impose a one-day suspension are asked to report the incident to appropriate departmental, collegiate, and Student Life personnel.

WHAT WILL BE COVERED

We will start with a math review followed by a description of the principles of thermodynamics making a connection with statistical mechanics. Topics will include Heat, Work, Energy, Entropy, Thermochemistry, Chemical Equilibrium, Solutions and Partition Functions among others.