The University of Iowa
The College of Liberal Arts and Sciences
Spring 2023

Course: Chemistry 4431: Chemical Thermodynamics
Instructor: Dr. Nicole Becker
Office: E355 Chemistry Building
Email: Nicole-becker@uiowa.edu

Lecture: MWF 8:30-9:20 am PH 315
Discussion: T 5:00-5:20 pm or W 3:30-4:20 pm 129 PC

Student Drop-In Hours

<table>
<thead>
<tr>
<th>Individual</th>
<th>Location</th>
<th>Time</th>
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<tbody>
<tr>
<td>Dr. Nicole Becker</td>
<td>E355 CB</td>
<td>Wednesday 2 – 3:30 pm Or by appointment</td>
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<td>Zoom</td>
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<td>Thursday 3:30 – 5:00 pm Or by appointment</td>
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<tr>
<td>Hannah Crull</td>
<td>E208 CB</td>
<td>Tuesday 12:30 – 1:30 pm Thursday 12:30 – 1:30 pm</td>
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Course ICON site: To access the course site, log into Iowa Courses Online (ICON) https://icon.uiowa.edu/index.shtml using your Hawk ID and password.

Course Description:
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.

This course is challenging predominantly because it requires you to interpret diagrams and mathematical expressions in varying contexts to extract new concepts that you have not seen before. Reading out information from abstract representations is an information processing skill rather than one of conceptual fluency and must be practiced. Our goal through this course will be to facilitate both the learning of concepts and of information processing and other process skills which will allow you to succeed in class, in the homeworks/exams of this course, and in your future career.
Course special policies:

- **Attendance**: Classroom attendance is extremely important for this class and is your most efficient route to learn the material for the exams. This is reflected in the grading structure for this course.
- **Workbook**: We require that you physically write in the POGIL workbook (listed above) in every class. Please ensure you have this by the first lesson.
- **Email policy**: To facilitate instruction, we will answer emails as a team. In general, we will answer emails during or immediately after our office hours. For chemistry-related questions, you will need to book appointments or come during office hours. If you have a dispute over grading, you will need to wait 24 hours after the grade comes back, then you have 7 days to raise a dispute. You will need to raise this dispute in person at office hours.
- **Use of ICON**: Participation in this class requires you to check ICON regularly for updates to homework and announcements. You are invited to contact the instructors if you have any problems or concerns about this.

**Texts:**


**Optional Resource:**


**Course Organization:**

This course has been designed and organized to help you learn physical chemistry, but no course or instructor can learn for you. **Learning is something only you can do.**

To support your active engagement in the learning process, class time will be used to engage in guided inquiry lessons. Nearly all of the activities in class will involve teamwork. Part of your responsibility for this course is to assist the other members of your group (and the entire class) in understanding the material.

The homework consists of two parts:

- There will be pre-activity questions assigned for most lessons. These should take no longer than 15-20 minutes, and will be taken in for grading during the next lesson and you will typically be allowed to have these in front of you when we do in-class quizzes.
- Longer problem sets will also be provided once a week. Since problem solving is a very important aspect of this course, these provide opportunities for you to practice applying your knowledge and help you determine which material you do not understand well. Homework problems to be turned in and graded will be assigned approximately weekly throughout the semester.

There will be three 90-minute midterm exams and a cumulative final for this course. Exams provide an opportunity for you to demonstrate your knowledge of the material and let me know what students have mastered and where the problem areas are.
Grading & Grade scale:

Grades will be determined by classroom activities, homeworks, performance on three midterm exams, and a cumulative final exam. **We believe the variety of assessment methods will improve your ability to learn in this course.** Final grades will include +/- grades. Those grades will not necessarily be evenly split among the three categories. The College and EPC has recommended that the A+ grade be omitted altogether.

Grades will be earned in approximately the following distributions, depending on where the learning objectives are best assessed:

- **Class activities (incl. attendance, discussion, class participation/activities, quizzes as needed, some homeworks graded in class, workbook completion)**
  ~25-35%
- **Hour exams, final exam**
  ~33-50%
- **Homework problems**
  ~33-50%

Due to the weightings given above, the ICON gradebook may not reflect your overall performance in the course. You are invited to come to office hours to discuss grading concerns.

No quizzes or exams will be given in the final week of instruction prior to finals week. Midterm exam dates are set on MyUI at the start of semester with the final date posted when they are confirmed by the registrar’s office.

For those students aiming for a C grade or above:
  - We expect you to participate in every class, every discussion section, complete every homework, and problem set. Here, engaging with the practice of physical chemistry is more important to us than the mastery you obtain in the content knowledge.
  - A lower grade boundary of 60% is anticipated for the C-/C/C+ grade range.

For those students aiming for grades A and B, in addition to the standard set forward by the statement above:
  - We will award an A-grade to indicate a mostly complete mastery of the learning objectives for this course and a B-grade to indicate partial mastery.
  - A lower grade boundary of 85% is anticipated for an A-/A grade and a lower grade boundary of 75% is anticipated for the B-/B/B+ grade range.

Expectations for grades are based on degree of mastery of course content. Students may vary in their competency levels on these abilities. Students can expect to acquire these abilities only if they honor all course policies, attend class meetings regularly, complete all assigned work in good faith and on time, and meet all other course expectations. **Students whose achievement is in the indicated ranges will not receive a grade lower than that regardless of the distribution.** No limit is placed on the number or percentage of students who can attain each grade.

**Attendance Policy:**

Attendance at all lecture sessions is expected and attendance records are maintained. Legitimate reasons for absences are accepted and when possible prior notice of expected absences is expected. Homework will not be accepted late except for an excused absence.
As soon as you know that you will be absent for a class, report this to the instructors and then fill out the following form: https://clas.uiowa.edu/sites/default/files/ABSENCE%20EXPLANATION%20FORM.pdf

We will follow the CLAS policy regarding documentation which can be found here: https://clas.uiowa.edu/faculty/student-attendance-and-absences#absences-short-term-illness

COVID-19 Spring 2023:

The University of Iowa strongly encourages students, faculty, and staff to be vaccinated and boosted against COVID-19. The university also encourages students, faculty, and staff to wear a face mask while on campus, and strongly encourages the use of face masks in all classroom settings and during in-person office hours. However, face mask usage is not required except on CAMBUS and in specified research and healthcare settings. Information about COVID on the University of Iowa campus can be found here: https://coronavirus.uiowa.edu/

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 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 a minimum of six hours per week outside of class on activities related to this course.

Academic Honesty and Misconduct

All students in CLAS courses are expected to abide by the CLAS Code of Academic Honesty. Undergraduate academic misconduct must be reported by instructors to CLAS according to these procedures. In addition to the Academic Honesty code offenses detailed by the College, there are course specific expectations regarding Academic Honesty. Academic misconduct may result in a grade reduction and/or other serious penalties, up to and possibly including expulsion from the University of Iowa.

Examinations: You are expected to work alone. Cheating will not be tolerated. The instructor believes strongly in fairness for all students and objective appraisal of individual performance and understanding of material.

Problem Sets: The homework for this course is designed to help you master your knowledge related to the topics covered during lecture. As such, you may work on the homework problems with others or use online resources; however, please be aware that to master the skills needed for this class, practice is required and that to do well on exams you will need to work many of these problems multiple times without help. Be sure to test your knowledge by doing much of the homework on your own. I encourage you to ask your classmates for help, but be sure you ask them to explain their reasoning in a way that you can understand to ensure you acquire an independent understanding of the course material.

The above schedule, policies, procedures and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement and/or to ensure better student learning.
Student Complaints
Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the Director or Chair of the school, department, or program offering the course.

Undergraduate students should contact CLAS Undergraduate Programs for support when the matter is not resolved at the previous level. Graduate students should contact the CLAS Associate Dean for Graduate Education and Outreach and Engagement when additional support is needed.

Drop Deadline for this Course
You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the drop deadline for this course here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the Registrar’s website. Undergraduate students can find policies on dropping and withdrawing here. Graduate students should adhere to the academic deadlines and policies set by the Graduate College.

College of Liberal Arts and Sciences (CLAS): Policies and Procedures
Accommodations for Students with Disabilities
Basic Needs and Support for Students
Classroom Expectations
Exam Make-up Owing to Absence
Free Speech and Expression
Mental Health
Military Service Obligations
Non-discrimination
Religious Holy Days
Sexual Harassment/Misconduct and Supportive Measures
Sharing of Class Recordings