

<b>Instructor:</b>	Dr. Caleb Thompson	<b>Teaching Assistant:</b>	William Brown
<b>Office:</b>	1608 Gilman Hall	<b>Office hour location:</b>	TBD
<b>Phone:</b>		<b>Office Hours:</b>	TBD
<b>Office Hours:</b>	TBD, in Gilman 2760	<b>E-mail:</b>	wbrown2@iastate.edu
<b>E-mail:</b>	calebt2@iastate.edu	<b>Pronouns:</b>	-
<b>Pronouns:</b>	People tend to label me He/Him/His, but honestly any are fine :)		

**Chem 325 Lecture:** MWF 1:10 – 2 PM, Gilman 0611 or via Webex

**Course Description/Learning Outcomes:** In Chemistry 325 (3 credits) you will learn fundamental thermodynamic principles including properties of gases, partition functions, the first law of thermodynamics, the second law of thermodynamics, the third law of thermodynamics, Helmholtz and Gibbs energies, phase equilibria and solutions. Success in Chemistry 325 should prepare you well for Chemical Engineering 381 (Chemical Engineering Thermodynamics).

**Prerequisites:** Chem 178, Math 166. (Phys 222 is recommended)

**Required Materials:**

Textbook: Either Molecular Thermodynamics – McQuarrie and Simon, University Science Books, 1999 (ISBN: 9781891389054) or Physical Chemistry: a Molecular Approach – McQuarrie and Simon, University Science Books, 1999 (ISBN: 9780935702996). McQuarrie and Simon wrote a Physical Chemistry trilogy of text books (Quantum Mechanics, Thermodynamics, and Molecular Dynamics), and also released them as a single large textbook. Choose which one works for you!

Calculator: **a scientific calculator** with the functions:  $\ln(x)$ ,  $e^x$ ,  $10^x$ ,  $y^x$  is essential. Graphing calculators are permitted.

**Attendance:** Class meets MWF 1:10 pm in 0611 Gilman. **Students may attend class in person (face to face), join remotely using Webex, or watch a Webex recording posted to Canvas.** Attendance is not mandatory! Learn however makes you the most comfortable and fits your needs. To attend the class remotely, log into the Canvas 325 course, click on Webex and join. FYI I recommend downloading the Webex application instead of loading it in the browser. Remote attendees may fully participate using chat to ask/answer questions but are asked to mute themselves when not talking.

**Online Learning Materials:** Throughout the semester, some required course content may be presented online via the canvas page.

**Office Hours:** TBD in my office, Gilman 2760

**Assignments:** Homework assignments (problem sets) will be posted on Canvas. They are due Sundays at 11:59 pm – uploaded to Canvas.

If you have issues with scanning your HW and converting it to a pdf:

- iPhones have a camera to pdf converter – visit the following link for instructions: <https://support.apple.com/en-us/HT210336>.
- On android phones, several free apps are available on GooglePlay (Simple Scanner and Adobe Scan work easily and well).
- The libraries on campus have a printer /photo copier/ scanner. Ask the librarians if you need help with this.

No credit will be received for late homework. However, if you have extenuating circumstances and you talk to me about it, I'll always discuss options and work with you. I view rules as a general guide that flex and bend with specific circumstances.

**For each homework assignment, the following problem is included as part of the assignment:** *Create one problem including the solution that would be suitable for inclusion on an exam in this class. Every week the student(s) who write the "best" one or two questions will be awarded 1 extra credit point. Criteria for selection as "best:" 1) Relates the material to a real-world application, 2) Relates a calculation to underlying concepts, 3) Creativity and/or uniqueness, 4) Relevance to material, and 5) Suitability for inclusion on our exams (not too time-consuming, representative of material covered in class, conceptual content)*

**Note: Illegible exams or problem sets will NOT be graded. All work must be presented reasonably, neatly, and logically; all work MUST be shown. A correct answer without supporting work will receive a score of 0. Problems MUST be listed in the order given on the assignment.**

**Exams:** There will be three one hour exams (each worth 20% of the final grade) and a *comprehensive* final exam (25% of the final grade). Exam dates are listed below and are administered during the normal lecture time in the lecture room – 0611 Gilman.

**Exam 1** Monday Feb 17 @1:10 pm (likely to cover Chapters 1 – 3, MathChapters A & B)

**Exam 2** Monday Mar 17 @1:10 pm (likely to cover Chapters 3 – 5, MathChapters C)

**Exam 3** Monday Apr 14 @1:10 pm (likely to cover Chapters 5 – 7, MathChapter D)

**Final Exam** TBD in Finals week May 12 – 17

**Legal Cheat-sheet:** Students may bring a single handwritten notes page or legal cheat sheet to each exam. All information on the page must be handwritten and the paper size must be standard letter (8.5 by 11 inches) or smaller. You may use both sides of the page. Note that all important equations and constants and all needed data will be provided in each exam. If you are ever missing information please just ask! :)

**All exams, including the final exam, will be retained by the course instructor. Students will have opportunities to view the graded exams.**

The ISU final examinations policy will be followed absolutely: <http://www.registrar.iastate.edu/students/exams>. Students who have three or more finals on the same calendar day may request to reschedule a final. The instructor of the course having the smallest number of students is responsible for arranging an alternate examination time for the student unless make-up exam times are available in one of the other courses. Alternative final exam times will only be scheduled for students with a conflicting final exam time or those with three or more finals scheduled for the same days as listed above (and with Chem 325 as their smallest course). There will be no exceptions.

**Make-up exams will be administered only in exceptional cases**, which must be discussed with the instructor. This will be at my discretion! This may sound scary, but I will almost always hear anyone out. If you have an issue, problem, or concern, please just come let me know and I'll work with you.

**Regrades on exams or homework assignments:** Students have a deadline of **2 weeks** following an exam or homework assignment to request a regrade. Regrade requests must be limited to the correction of errors in grading. After 2 weeks, scores are set.

**Grading:** The grade will be 12% from problem assignments, 3% from in-class quizzes and exercises and on-line quizzes and self-assessments, 20% from each of the three one hour exams and 25% from the final exam. Plus-minus grading will be used for the final grade. Grades are based upon straight percentages with the following scale. The instructor reserves the right to modify the grading scale. Final grades are not negotiable.

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
>93.29	90.0– 93.29	86.7– 89.99	83.3– 86.69	80.0– 83.29	76.7– 79.99	73.3– 76.69	70.0– 73.29	66.7– 69.99	63.3– 66.69	60.0– 63.29	<60.0

**Canvas:** <https://canvas.iastate.edu/> Canvas will be used for posting of scores and grades and will be central to disseminate information (such as lecture notes and problem sets) and announcements for the class. It is the student's responsibility to check posted grades for accuracy. Any student who discovers an error in a grade on Canvas **MUST** bring the graded work to the attention of a teaching assistant or the course instructor within 2 weeks of submission of the work.

**Classroom etiquette:** My goal is that everyone can be comfortable and welcome in my class. Apart of this is the expectation that you will respect your fellow students and the instructor during the class. While I'm bubbly, accommodating, and very nice, I'm NOT a pushover. If you are participating honestly and earnestly, I will move the earth for you. However, if you try to exclude or bully someone... I guarantee it won't end well for you.

**Illness or other emergencies:** If you have a health issue or other emergency that requires you to miss multiple classes, you are advised to contact the Dean of Students Office (<http://www.dso.iastate.edu/sa>) and your academic adviser to keep them informed of your situation. If you cannot attend class in-person due to quarantine or a minor illness, you do not need to contact the instructor: you may always attend remotely (except for exams).

**Right to Privacy:** The Federal Right-to-Privacy Act (FERPA) prohibits the instructor from public disclosure of exam scores. You may obtain your exam scores in person from your TAs or the course instructor or using the online grade book. The instructor and the TAs are prohibited from giving grades over the phone or e-mail. Instructors and TAs are not permitted to discuss a

student's academic performance with anyone other than the student, their academic adviser, or ISU staff or faculty who have need of this information; Faculty, including TAs, may not discuss academic performance with a student's relatives, friends, or potential employers.

**Order of Events:**

Introduction & Overview

Ch 1: The Energy Levels of Atoms and Molecules

MathCh A: Numerical Methods

Ch. 2: The Properties of Gases

MathCh B: Probability & Statistics

Ch 3: The Boltzmann Factor & Partition Functions

MathCh C: Series and Limits

Ch 4: Partition Functions & Ideal Gases

MathCh D: Partial Differentiation

Ch 5: First Law of Thermodynamics

MathCh E: Binomial Dist. & Stirling's Approximation

Ch 6: Entropy & Second Law

Ch 7: Entropy and Third Law

Ch 8: Helmholtz and Gibbs Energies

Ch 9: Phase Equilibria

Ch 10: Solutions I: Liquid-Liquid Solutions

Ch 11: Solutions II: Liquid-Solid Solutions

Ch 12: Chemical Equilibrium

## SYLLABUS STATEMENTS ON SAFETY, BEHAVIOR, RESPECT, AND UNIVERSITY POLICIES

### COVID-19 health and safety requirements

Students are responsible for abiding by the university's [COVID-19 health and safety expectations](#). All students attending this class in-person are required to follow university policy regarding health, safety, and face coverings:

- wear a cloth face covering in all university classrooms, laboratories, studios, and other in-person instructional settings and learning spaces. Cloth face coverings are additionally required to be worn indoors in all university buildings, and outdoors when other people are or may be present where physical distancing of at least 6 feet from others is not possible. Students with a documented health or medical condition that prevents them from wearing a cloth face covering should consult with [Student Accessibility Services](#) in the Dean of Students Office.
- ensure that the cloth face covering completely covers the nose and mouth and fits snugly against the side of the face.
- practice physical distancing to the extent possible.
- assist in maintaining a clean and sanitary environment.
- not attend class if you are sick or experiencing symptoms of COVID-19.
- not attend class if you have been told to self-isolate or quarantine by a health official.
- follow the instructor's guidance with respect to these requirements. Failure to comply constitutes disruptive classroom conduct. Faculty and teaching assistants have the authority to deny a non-compliant student entry into a classroom, laboratory, studio, conference room, office, or other learning space.

These requirements extend outside of scheduled class time, including coursework in laboratories, studios, and other learning spaces, and to field trips. These requirements may be revised by the university at any time during the semester.

In accordance with university policy, instructors may use a face shield while they are teaching as long as they are able to maintain 8 feet of physical distance between themselves and students during the entire instructional period. Some form of face covering must be worn at all times in learning spaces regardless of the amount of physical distancing.

Faculty may refer matters of non-compliance to the Dean of Students Office for disciplinary action, which can include restrictions on access to, or use of, university facilities; removal from university housing; required transition to remote-only instruction; involuntary disenrollment from one or more in-person courses; and other such measures as necessary to promote the health and safety of campus.

It is important for students to recognize their responsibility in promoting the health and safety of the Iowa State University community, through actions both on- and off-campus. The university's faculty asks that you personally demonstrate a commitment to our [Cyclones Care campaign](#). Iowa State University's faculty support the Cyclones Care campaign and ask you personally to demonstrate a commitment to our campaign. Your dedication and contribution to the campaign will also protect your family, classmates, and friends, as well as their friends and families. Our best opportunity for a successful semester with in-person learning and extramural activities requires all of us to collaborate and fully participate in the Cyclones Care campaign.

### Academic Dishonesty

Academic Integrity, based on the values of honesty, trust, fairness, respect, and responsibility, is a fundamental principle of scholarship in higher education. Iowa State's Academic and Research Misconduct Policy prohibits: plagiarism (using another person's writing or copying any work without proper citation); falsification; unauthorized collaboration during a test or on an assignment or substitution for another student to take an exam, course or test; and other forms of academic dishonesty. If you are to benefit from this class and be properly evaluated for your contributions, it is important for you to be familiar with and follow Iowa [State's Academic Dishonesty and Research Misconduct policies](#). Students are also encouraged to review these [Student Resources](#). Work that violates this policy will not be tolerated. Students who are found responsible for a violation of the Academic Misconduct Policy will

have both a university process sanction and an academic outcome that could include a failing grade on the assignment or exam, or a failing grade for the course.

The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office: <https://www.studentconduct.dso.iastate.edu/academic-misconduct>

### **Accessibility Statement**

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at [www.sas.dso.iastate.edu](http://www.sas.dso.iastate.edu), by contacting SAS staff by email at [accessibility@iastate.edu](mailto:accessibility@iastate.edu), or by calling 515-294- 7220. Student Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.

### **Usability, disability and design**

I am committed to creating a course that is inclusive in its design. If you encounter barriers, please let me know immediately so that we can determine if there is a design adjustment that can be made or if an accommodation might be needed to overcome the limitations of the design. I am always happy to consider creative solutions as long as they do not compromise the intent of the assessment or learning activity. You are also welcome to contact the Student Accessibility Services (515-294-7220) to begin this conversation or to establish accommodations for this or other courses. I welcome feedback that will assist me in improving the usability and experience for all students.

### **Prep Week**

This class follows the Iowa State University Prep Week policy, as noted in the ISU Policy Library and section 10.6.4 of the Faculty Handbook. (<https://www.provost.iastate.edu/faculty-and-staff-resources/faculty-handbook>).

### **Discrimination and Harassment**

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email [eooffice@iastate.edu](mailto:eooffice@iastate.edu).

### **Mutual respect and professionalism:**

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Your comments to others should be factual, constructive, and free from harassing statements. You are encouraged to disagree with other students, but such disagreements need to be based upon facts and documentation (rather than prejudices and personalities). It is the instructor's goal to promote an atmosphere of mutual respect in the classroom. Please contact the instructor if you have suggestions for improving the classroom environment. It is preferable if students discuss issues directly with the instructor, however, students may also leave a note in the instructor's mailbox.

### **Religious Accommodation**

Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review

the situation in an effort to provide a reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the Dean of Students Office at 515-294-1020 or the Office of Equal Opportunity at 515-294-7612.

### **Free Expression**

Iowa State University supports and upholds the First Amendment protection of [freedom of speech](#) and the principle of [academic freedom](#) in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

### **Name, gender identity and/or gender expression:**

Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me accordingly early in the semester so that I may make appropriate changes to my records.

### **Promoting student health and wellness**

- Iowa State University is committed to proactively facilitating the well-being of all students. We welcome and encourage students to contact the following on-campus services for assistance regarding their physical, intellectual, occupational, spiritual, environmental, financial, social, and/or emotional needs:
- Student Wellness call (515) 294-1099 or via the website (<http://studentwellness.iastate.edu>);
- Thielen Student Health Center call (515) 294-5801 (24/7 Medical Advice) or via the website (<http://www.cyclonehealth.org>);
- Student Counseling Services call (515) 294-5056 or via the website (<https://counseling.iastate.edu>);
- Recreation Services call (515) 294-4980 or via the website (<http://recservices.iastate.edu>).
- Students dealing with heightened feelings of sadness or hopelessness, thoughts of harm or suicide, or increased anxiety may contact the ISU Crisis Text Line (Text ISU to 741-741) or contact the ISU Police Department (515) 294-4428.

### **Fostering a safe community**

Green Dot Project: A green dot is any choice, behavior, word or attitude that promotes safety for everyone and communicates utter intolerance for power-based personal violence in our Iowa State University community. A green dot is anything you do to make our community safer. What is your Green Dot? Visit the Green Dot – Student Wellness website (<http://www.studentwellness.iastate.edu/greendot/>).

### **ISU's Principles of Community**

Students are responsible for living the tenets established in ISU's Principles of Community: Respect, Purpose, Cooperation, Richness of Diversity, Freedom from discrimination, and the Honest and respectful expression of ideas. Visit ISU's Principles of Community website (<http://www.diversity.iastate.edu/principles-of-community>)

### **Contact Information for Academic Issues**

If you are experiencing, or have experienced, a problem with any of the above issues, please email [academicissues@iastate.edu](mailto:academicissues@iastate.edu) (This email address for contact information is monitored and answered through the Office of the Senior Vice President and Provost.)

### **Academic Success Center.**

We support. You succeed! The Academic Success Center (Dean of Students Office) provides learning opportunities for all students through services that support academic skill development, grade improvement, and engagement with peers, all of which promote success and self-directed learning. The ASC offers individualized and group-facilitated experiences connected to a specific course, or focus on general skill development. Services include [Academic Coaching](#), [Resources and Worksheets](#), [Supplemental Instruction](#), [Tutoring Services](#), the [Workshop Series](#), and [PSYCH 131, an academic skills course](#). The ASC encourages students to use the supports that can best

strengthen their learning. Learn more about ASC services, employment opportunities, office location, via our the [Academic Success Center website \(http://www.asc.dso.iastate.edu\)](http://www.asc.dso.iastate.edu), call 515-294-6624, or email [success@iastate.edu](mailto:success@iastate.edu).