

CHM4411L: Physical Chemistry - Thermodynamics

Instructor: Clifford Bowers

Email: Please use Canvas messaging for all correspondence

Office Hours: W 10:30-12:30 (via Zoom)

ID: 954 947 5969

Pass: CHM4411

[Zoom Link \(Links to an external site.\)](#)

Teaching Assistant: Ignacio Pickering

Office Hours: MF 10:40-11:40 (via Zoom)

ID: 478 111 7654

Pass: CHM4411

[Zoom Link](#)

Textbook

Physical Chemistry, 4th Edition, Wiley ([E-Book](#))

Robert J. Silbey, Robert A. Alberty, Moungi G. Bawendi

ISBN: 978-0-470-47300-9

Additional Resources

Atkins' Physical Chemistry 11e, Volume 1: Thermodynamics and Kinetics, Peter Atkins, Julio de Paula, and James Keeler, 2018 ISBN: 9780198817895, Paperback, [Oxford University Press](#)

Course Description

This subject deals primarily with equilibrium properties of macroscopic systems, basic thermodynamics, chemical equilibrium of reactions in gas and solution phase, and rates of chemical reactions.

Activity Schedule (subject to change)

Session	Date	Topic	Homework Due
1	Jan 12	State of a system, 0th law, equation of state	
2	Jan 14	Work, heat, first law	
3	Jan 19	Internal energy, expansion work	
4	Jan 21	Enthalpy	
5	Jan 26	Adiabatic changes	Problem set 1

6	Jan 28	Thermochemistry	
7	Feb 2	Calorimetry	
8	Feb 4	Second law	Problem set 2
9	Feb 9	Entropy and the Clausius inequality	
10	Feb 11	Entropy and irreversibility	
11	Feb 16	Fundamental equation, absolute S, third law	Problem set 3
12	Feb 18	Criteria for spontaneous change	
13	Feb 23	Exam 1	
14	Feb 25	Gibbs free energy	
15	Mar 2	Multicomponent systems, chemical potential	
16	Mar 4	Chemical equilibrium	Problem set 4
17	Mar 9	Temperature, pressure and K_p	
18	Mar 11	Equilibrium: application to drug design	
19	Mar 16	Phase equilibria — one component	Problem set 5
20	Mar 18	Clausius-Clapeyron equation	
21	Mar 23	Phase equilibria — two components	
22	Mar 25	2 nd Exam	
23	Mar 30	Ideal Solutions	
24	Apr 2	Non-ideal solutions	Problem set 6
25	Apr 6	Colligative Properties	
26	Apr 8	Introduction to statistical mechanics	
27	Apr 13	Partition function (q)	Problem set 7
28	Apr 15	Partition function (Q)	
29	Apr 20	Model Systems	Problem set 8
	Apr 29	FINAL EXAM @ 7:30 AM - 9:30 AM	

1) Our class sessions may be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate verbally are agreeing to have their voices recorded.

If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared.

As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

2) The course is 100% online. All lectures and office hours will be conducted through Zoom. The course is managed through Canvas. Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

[More information in the university attendance policies](#)

Meeting times

Lectures: T,R | Period 2 - 3 (8:30 AM - 10:25 AM)

Attendance Policy

If you're going to miss any lecture for any reason, please let the instructor know in advance. Don't be late. We keep tabs on that.

Grading

Your grade will be derived from the weighted average of performances in each component:

Quizzes	500 points
Homework	200 points
Final Exam	300 points
Total	1000 points
Extra Credit: good conduct	up to 25 points*

*All students will enjoy a 25-point bonus for acting in a professional manner that is conducive to effective learning engagement, respect for peers, and respect for the instructors. Students with more than two violations will be ineligible for this automatic extra credit.

Examples:

- Unauthorized distribution of external links through zoom chat.
- Sending an un-signed external email to the instructor or TA
- Excessive copying or sharing of the problem set answers between or among users on external social media type apps. This borders on honor code violations which will be reported. No copying, sharing, or cooperation of any kind is allowed on quizzes or the exam. You must work independently on those assignments.

Grade Scale:

Grade	Range
A	1000-900
B	900-800
C	800-700
D	700-600

Anyone scoring over 900 points will receive an A grade, 800-900 will be B, and 700-800 will be a C. However, it is anticipated that the class will eventually be “curved” downward, so that, for example, it may be possible to get an A with a score in the B or (maybe?) C range. However, a student getting 904 points will get an A, even if every student in the class gets more than 900 points.

All grades will be posted in Canvas, as available.

UF's Grading Policy

<http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

Suggested Software

MagicPlot Pro - professional plotting and analysis software. An annual license is available with a special price \$19 (USD) for university students. Contact MagicPlot (<https://magicplot.com/contacts.php>) using your UF e-mail address to request instructions on how to complete the order. Note: This is a full-functional license for the Pro edition, not to be confused with MagicPlot Student edition which is a limited-function version and free of charge.

PDF Scan Software - for scanning your notebook pages into PDF for uploading onto Canvas. [Genius Scan](#), by Grizzly Labs, is highly recommended. The app is available for IOS or Android phones. PDF scans can be directly uploaded to Cloud Storage such as UF Google Drive, Dropbox, or UF OneDrive.

Spreadsheet software - Microsoft Excel or Google Sheets. For manual data logging and data manipulation, and quick plots of raw data. For reports, better quality plots can be generated using Magic Plot (see above).

Word Processing - The standard is MS Word with the built-in equation editor. Any other word-processing software with equation editing capability is also acceptable. Fancier equation formatting can be achieved using the [MathType](#) plugin from Design Science is optional.

UFApps - UFApps offers a large number of different software packages to UF students free of charge.

Mathematica – Wolfram’s symbolic math program. Students have access to Mathematica through UFApps. A tutorial can be found here: <https://www.wolfram.com/language/elementary-introduction/2nd-ed/index.html>

UF OneDrive - required for transferring files between your local computer and UFApps.

Late Submission Policy

Late assignments will receive a late penalty of 10% per day past the scheduled due date. If something arises that prevents you from completing the assignment on time, contact the instructor as soon as possible to request an extension.

Getting Help

For the quickest response, you might find it useful to post questions to the Canvas Discussion Board. Messaging the Instructor, TA, or even a classmate also works.

For Username/Password issues, such as difficulties logging into any Gatorlink-authenticated site at UF, (including our course website), please contact the UF Help Desk at: helpdesk@ufl.edu, (352) 392-HELP - select option 2.

UF Policies Shaping This Course

This course is aligned with the UF policies below.

- **Contact Hours:** "Contact Hours" refers to the hours per week in which students are in contact with the instructor, excluding office hours or other voluntary contact. The number of contact hours in this course equals the number of credits the course offers.
- **Workload:** As a Carnegie I, research-intensive university, UF is required by federal law to assign at least 2 hours of work outside of class for every contact hour. Work done in these hours may include reading/viewing assigned material and doing explicitly assigned individual or group work, as well as reviewing notes from class, synthesizing information in advance of exams or papers, and other self-determined study tasks.
- **Accommodation for Student with Disabilities:** Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. This class supports the needs of different learners; it is important for students to share their accommodation letter with their instructor and discuss their access needs as early as possible in the semester.

- Statement Regarding Evaluations: Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available from [the Gatorevals website](#). Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via [the evaluation system](#). Summaries of course evaluation results are available to students at the [public results website](#).
- Statement Regarding Course Recording: Our class sessions may be audio visually recorded for students in the class to refer back to and for use of enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate verbally are agreeing to have their voices recorded. If you are unwilling to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

University Policy on Academic Misconduct

This class will operate under the policies of the student honor code which can be found at: <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>. The students, instructor, and TAs are honor-bound to comply with the Honors Pledge: **We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.** You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."* It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks. Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>.

Additional UF Policies and Resources

University Police

The UF police are together for a safe campus. 392-1111 (or 9-1-1 for emergencies)
<http://www.police.ufl.edu/>.

Career Connections Center

[Career Connections Center](#)(352-392-1601 | CareerCenterMarketing@ufsa.ufl.edu) connects job seekers with employers and offers guidance to enrich your collegiate experience and prepare you for life after graduation.

Counseling and Wellness Center

[Counseling and Wellness Center](#)(352-392-1575) provides counseling and support as well as crisis and wellness services including a [variety of workshops](#) throughout the semester (e.g., Yappy Hour, Relaxation and Resilience).

Dean of Students Office

[Dean of Students Office](#)(352-392-1261) provides a variety of services to students and families, including [Field and Fork](#) (UF's food pantry) and [New Student and Family programs](#)

Disability Resource Center

- [Disability Resource Center](#)(DRCaccessUF@ufsa.ufl.edu | 352-392-8565) helps to provide an accessible learning environment for all by providing support services and facilitating accommodations, which may vary from course to course. Once registered with DRC, students will receive an accommodation letter that must be presented to the instructor when requesting accommodations. Students should follow this procedure as early as possible in the semester.

Multicultural and Diversity Affairs

[Multicultural and Diversity Affairs](#)(352-294-7850) celebrates and empowers diverse communities and advocates for an inclusive campus.

Office of Student Veteran Services

[Office of Student Veteran Services](#)(352-294-2948 | vacounselor@ufl.edu) assists student military veterans with access to benefits.

ONE.UF

[ONE.UF](#) is the home of all the student self-service applications, including access to:

- [Advising](#)
- [Bursar](#)(352-392-0181)
- [Financial Aid](#)(352-392-1275)
- [Registrar](#)(352-392-1374)

Official Sources of Rules and Regulations

The official source of rules and regulations for UF students is the [Undergraduate Catalog](#) and [Graduate Catalog](#). Quick links to other information have also been provided below.

- [Student Handbook](#)

- [Student Responsibilities](#), including academic honesty and student conduct code
- [e-Learning Supported Services Policies](#) includes links to relevant policies including Acceptable Use, Privacy, and many more
- [Accessibility](#), including the Electronic Information Technology Accessibility Policy and ADA Compliance
- [Student Computing Requirements](#), including minimum and recommended technology requirements and competencies.

DISCLAIMER

All aspects of course operations, including grading scale, points distribution course policy, and policy execution, are subject to change at the discretion of the course instructor at any time without notice.