

CHM4411 - Physical Chemistry: Thermodynamics

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Suggested Textbook: P.W. Atkins *Physical Chemistry*

Course Schedule

Week	Dates	Material
Fundamental Theory of Thermodynamics		
I	Sep 1 [†] , 3	Maxwell-Boltzmann Distribution and Molecular Movement
II	Sep 8,10	Gas Laws and the First Law
III	Sep 15 ^{††} ,17	First Law and First law: heat, work and energy conservation
IV	Sep 22,24	Wrap up First law, Microscopic Entropy and the second law
V	Sep 29 ^{††} , Oct 1	Macroscopic Entropy and the second law
VI	Oct 6,8	More on the second law
VII	Oct 13 ^{††} ,15*	Yet more on the second law, and the “third law”
Applications of the Fundamentals		
VIII	Oct 20,22	Clapeyron Equation and Phase Equilibria
IX	Oct 27 ^{††} ,29	Solutions and multicomponent phase equilibria
X	Nov 3,5	More on solutions, and colligative properties
XI	Nov 10,12 ^{††}	Chemical equilibrium, which you already know
XII	Nov 17,19 [†]	Thermo meets quantum: an introduction to statistical thermodynamics

† - Homework assignments will be available.

†† - Homework assignments are due.

* - Midterm (take home) exam.

Scope of Material

CHM4411 is a first course in physical chemistry, emphasizing the (very important) subject of thermodynamics. After studying the fundamental principles of the field, concepts will be applied to processes involving gases and condensed phases as well as to the treatment of reactive systems. In typical semesters, some aspects of chemical rate theory, statistical thermodynamics and quantum mechanics are often presented, but this will not be possible during this shortened semester. However, if you are able to garner enthusiasm for this subject in the midst of this somewhat unsatisfactory time in higher education, you are encouraged to avail yourselves of office hours (which must be held by zoom) and indulge your curiosity by asking questions.

Homework

Homework sets will be assigned every other Tuesday throughout the semester and are due two weeks later¹. Homeworks, which are downloadable (PDFs) from the piazza website, must be turned into one of the two TAs via email *no later than midnight of the due date*. As an example, the problems assigned on the Tuesday of Week V will be due at or before 11:59 PM on the Tuesday of Week VII. The homework sets are challenging and will take some time and effort, do *not* wait until the last minute to do them.

Examinations

This class will have two take-home exams. The first will be a midterm exam distributed on Oct. 15, which will cover the first part of the class. It will be due (again by email to one of the TAs) no later than 11:59 PM on Sunday, Oct. 18. Similarly, a final examination will be distributed on the last day of class (Nov. 19) and will be due no later than 11:59 PM on Sunday, Nov. 22. So we will all be done before Thanksgiving Day dinner, and let's all hope that things have returned to something resembling normalcy by then.

Class Website

While the syllabus is available on canvas, the principal class website is hosted on piazza. In addition to where notes, homework sets, and homework and exam solutions, piazza is also an extremely useful resource for asking questions outside of class and/or office hours. Students can post questions to piazza (anonymously if they choose), and these will be answered by me, one of the TAs, or someone else in the class. This system has been quite effective and popular since I started to use it a few years ago, and you are encouraged to answer the questions of your classmates if you are able. Both the TAs and I will monitor the goings on, and will make sure questions get answered, and get answered correctly.

¹An exception here is the final homework, which is due on the last day of class.

Grading Policy

The basis for grades in CHM 4411 will be performance on the midterm, final, and the homework assignments. Only the four highest (of six) homework scores will be counted. The distribution of points is as follows:

Homework	500
Midterm Exam	250
Final Exam	250
Total	1000

For sure, 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 maybe 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.

How Class will Work

It is recognized that the usual normalcy and flow of a semester is most unlikely to persist during the Fall of 2020. So that lectures are not “missed” for various reasons, all of them will be pre-recorded and available to watch at least two days before the actual “lecture date”. At this writing (Aug. 23), the first six lectures have been written and the first three have been recorded. The “normal” class time (starting at 9:30 AM on T and Th) will be devoted to working problems, answering questions, and discussing various special topics. These will be, in a sense, some sort of group “office hours” in which *no new material will be presented for which you will be held responsible*. It would be helpful for students to use piazza to post questions or ideas for topics that me (or the TAs) can go over during the usual class time.

To make this section a bit less confusing, here is how a week *might* look for you. Sunday evening: watch T lecture, more or less understand it, take a look at the homework that might be due on Tuesday. Post a note to piazza that you don’t understand something about problem 3 on the homework set, and request that it be talked about during “standard” class time. Tuesday morning: “Go to class”, get questions answered. Wednesday morning, watch Th lecture. You again “get” this lecture, so you don’t post anything to piazza for Th. Thursday morning: “Go to class” and listen and learn.

We will talk more about this on the first day of class, when I encourage all of you to show up on zoom. This semester will be an adventure for us all!

Miscellaneous Topics (from UF)

Disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter, which must be sent to the instructor when requesting accommodations. Students with disabilities should follow this procedure as early as possible in the semester.

Counseling

The University of Florida provides counseling services for students, staff, and faculty. See <http://www.counsel.ufl.edu/> or call (352) 392-1575 during regular service hours (8am - 5pm). For other hours or on weekends call the Alachua County Crisis Center (264-6789). Students may also call the clinician on-call at Student Mental Health for phone callback and consultation at (352) 392-1171.

Honor Code

UF students are bound by The Honor Pledge which states, We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students 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. The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. The Honor Code can be found at: <https://sccr.dso.ufl.edu/process/student-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. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Recording of Lectures

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 orally 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.