Chemistry 425/525: Chemical Thermodynamics

David Case, instructor. Office: 208B Proteomics, cell: 609-751-8668

email: *david.case@rutgers.edu*

Fall, 2022, Tuesdays and Fridays, 8:30 to 9:50 am, Hill Center 009

This is a one-semester physical chemistry course with an emphasis on applications of thermodynamics and statistical mechanics to chemical and biochemical systems. It is an advanced course, and will build on the introduction to chemical thermodynamics you should have received in physical chemistry courses like CCB 327, or its equivalent elsewhere.

The course text is *Molecular Driving Forces, 2nd ed*, by Ken Dill and Sarina Bromberg; there will be additional handouts for most topics. The table below gives an approximate time schedule; detailed reading assignments will be made as the class proceeds.

Week starting	Subject	Chapter
Sep 6,13	Equilibrium and the first law	1-4
Sep 20,27	Entropy and the second law	5-7
Oct 4	Free energy	8
Oct 11	Mixtures and partition functions	9-10
Oct 18	Simple gasses and solids	11
Oct 25, Nov 1	Chemical equilibria	12-14
Nov 8,15,23	Solutions, phase transitions	15-16
Nov 29	Special features of biomolecules	
Dec 6,13	Student project presentations	

The course website is http://casegroup.rutgers.edu/lnotes.html. Reading and homework assignments and additional course materials will be posted there. Final grades in the class will be based on assigned homework/problem sets (30%), exams (40%) and a course project (30%). Midway through the semester, each student will chose a project, which can be related to research you are carrying out, or to some facet of thermodynamics (broadly interpreted) that interests you. Students will be expected to make a short oral presentations to the rest of the class, as well as to attend and provide feedback to other student presentations. A written summary of the project will also be required. Two take-home exams will be given during the course of the semester and announced as least one week beforehand; there will not be an exam during the Final Exam period.

Please note: Students are expected to adhere the university policies on academic integrity and student conduct in all assignments, assessments and other matters regarding this course. You may consult with fellow students on homework and on class projects, but you must personally prepare and understand any written material you hand in. You may *not* consult with fellow students on the exams or the course project.

Rutgers University takes academic dishonesty very seriously. Academic dishonesty includes (but is not limited to):

- cheating

- plagiarism
- aiding others in committing a violation
- allowing others to use your work
- failure to cite sources correctly
- fabrication
- using another person's ideas or words without attribution
- re-using a previous assignment
- unauthorized collaboration
- sabotaging another student's work

If in doubt or unfamiliar with anything on this list, please consult the instructor. More information is available at https://nbacademicintegrity.rutgers.edu/.