

Chemistry 425/525, Spring 2017

Statistical Thermodynamics

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Spring 2017, Mondays and Wednesdays, 8:40 to 10am, WL 260

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 may have received in physical chemistry courses like CCB 327, 341, or 541.

The course text is *Molecular Driving Forces, 2nd ed*, by Ken Dill and Sarina Bromberg. We will skip around some in this book, and 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
Jan 18, 23	Quick review of classical of thermodynamics	3,5,6,8
Jan 30, Feb 6	Fundamentals of statistical thermodynamics	10,11,12
Feb 13, 20	Microscopic dynamics	18,24
Feb 27	Microscopic electrostatics	20,21,23
Mar 6	Mixtures: salt-water in biophysics	30,31
Mar 20	Chemical reaction rates	19
Mar 27, Apr 3	Cooperativity and allostery	26,28,29
Apr 10, 17	Biomolecular simulations; connections to experiment	29
Apr 24, May 1	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%), projects/presentations (30%) and exams (40%). Students will be assigned a substantial computational project during the semester, which may have several integrated components. Students will be expected to make presentations at the end of the semester on their projects to the rest of the class, as well as attend and provide feedback to other student presentations. Two take-home exams will be given during the course of the semester and announced as least one week beforehand.

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. These policies can be found online: <http://studentconduct.rutgers.edu/academic-integrity/>. 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.