Statistical Mechanics
CHEM 5123 (Spring 2011)

Times: M/W 9:00 to 10:15 am
Location: SLSRC 1100

Course Instructor: Dr. Jana Shen
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Course web site: http://ccb.ou.edu/teaching/chem5123.aspx

Description

This course introduces the fundamental concepts of statistical thermodynamics from the perspective of chemistry and biology. It is well suited for graduate and advanced undergraduate students in physical chemistry, biochemistry, bioengineering and chemical engineering. We will discuss the following topics, among others:

0) Probabilities, combinatorics, probability distribution functions
1) Entropy, Boltzmann distribution law
2) Principles of thermodynamics
3) Statistical mechanics of simple gases and solids
4) Microscopic perspective on temperature and heat capacity
5) Lattice models for liquids and solutions
6) Diffusion, transport and chemical kinetics: random flight model, Langevin model, Onsager relations, time correlation functions and transition state theory
7) Cooperativity: Landau model, Ising model, kinetics of phase transitions and nucleation
8) Polymers solutions: Flory-Huggins model, Flory theorem
9) Polymer conformations and dynamics: excluded volume, confinement, Rouse-Zimm model, reputation model
10) Water and hydrophobic effect

Pre-requisites

At least one undergraduate-level physical chemistry course is required or consult with the lecturer.

Grading Scheme

Home work: 70%
Final exam: 30%
Textbooks


Make-up exam and home work extensions

Make-up exams or assignment deadline extensions will be given only under extreme circumstances and only with prior notification and documentation. There will be no extra credit assignments given.

University codes and policies of behavior

See "University policies regarding instruction" downloadable from the Provost's website, [http://www.ou.edu/provost/pronew/content/memorand.html](http://www.ou.edu/provost/pronew/content/memorand.html)

Each student should acquaint her or his self with the University's codes, policies, and procedures involving academic misconduct, grievances, sexual and ethnic harassment, and discrimination based on physical handicap.

Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

Academic Misconduct

Any form of academic misconduct, as specified in the Student Code at OU and in the Chemistry Department's Graduate Student Handbook, will be reported to the Department and the Dean for appropriate action.

Other notes

The instructor reserves the right to change by addition and/or subtraction any and/or all materials contained in this syllabus. This includes, but is not limited to, course content, assignments, due dates, and portion(s) of the grade assigned to individual items within this course.