Topics in Statistical Thermodynamics
CHEM 5530 (Fall 2016)

Times: M/W 11:30am to 12:45 pm
Location: SLSRC 2410

Course Instructor: Dr. Ulrich H.E. Hansmann
Office: SLSRC 3040
Office hours: M/W after class or by appointment
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Course web site: http://hansmann-lab.com/cbpc/hansmann/5530.php

Description

The purpose of this course is to introduce fundamental concepts of statistical mechanics and thermodynamics from the viewpoint of chemistry and biology. The course is directed toward graduate and advanced undergraduate students in physical chemistry, biochemistry, bioengineering and chemical engineering, who will find that the presented conceptions appear in many contexts. The following concepts (among other) will be discussed:

1) Review of thermodynamics
2) The statistical basis of thermodynamics
3) Elements of ensemble theory
4) Quantum statistics
5) Statistical mechanics of simple gases and solids
6) Lattice models for liquids and solutions
7) Theory of phase transitions; mean field and Landau theory
8) Phase transitions and critical phenomena; exact models
9) Polymers solutions: Flory-Huggins model, Flory theorem
10) Polymer conformations and dynamics: Rouse-Zimm model

Textbooks

- Dill and Bromberg, “Molecular Driving Forces”, Garland Science, 2003
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%

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

**University Policies:**

**Academic Integrity:** Cheating is strictly prohibited at the University of Oklahoma, because it devalues the degree you are working hard to get. As a member of the OU community it is your responsibility to protect your educational investment by knowing and following the rules. For specific definitions on what constitutes cheating, review the Student’s Guide to Academic Integrity at [http://integrity.ou.edu/students_guide.html](http://integrity.ou.edu/students_guide.html). In order to be successful in this class, all work on exams and quizzes must be yours and yours alone. You may not receive outside help. On examinations and quizzes you will never be permitted to use your notes, textbooks, Should you see someone else engaging in this behavior, I encourage you to report it to myself or directly to the Office of Academic Integrity Programs. That student is devaluing not only their degree, but yours, too. Students engaging in academic misconduct (including cheating, plagiarism, and any other action that may improperly affect evaluation) will be subject to sanctions in accordance with the Norman Campus Academic Misconduct Code. Dr. Hansmann will assign an "F" for the course and may recommend expulsion from the University for such violations.

**Accommodation Policy:** The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. 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 as soon as possible so that we can discuss accommodations necessary to ensure full participation and to facilitate your educational opportunities. Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or TDD only 405/325-4173.
For more information please see the Disability Resource Center website http://www.ou.edu/drc/home.html

Adjustments for Pregnancy/Childbirth Related Issues: Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact Dr. Hansmann or the Disability Resource Center at 405/325-3852 as soon as possible. Please see http://www.ou.edu/eoo/faqs/pregnancy-faqs.html for answers to commonly asked questions.

Codes and Policies of Behavior Policy/Title IX Resources and Reporting Requirement: Each student should acquaint his or her self with the University codes, policies, and procedures involving academic misconduct, grievances, sexual and ethnic harassment, and discrimination based on physical handicap. For any concerns regarding gender-based discrimination, sexual harassment, sexual misconduct, stalking, or intimate partner violence, the University offers a variety of resources, including advocates on call 24/7. To learn more or to report an incident, please contact the Sexual Misconduct Office at 405-325-2215 (8 to 5, M-F) or OU Advocates at 405-615-0013 (24/7). Also, please be advised that a professor/GA/TA is required to report instances of sexual harassment, sexual assault, or discrimination to the Sexual Misconduct Office. For more information, please see http://www.ou.edu/eoo.

Religious Observance: It is the policy of the University to excuse absences of students that result from religious observances and to provide without penalty for the rescheduling of examinations and additional required classwork that may fall on religious holidays. Students who plan to observe a religious holiday should notify Dr. Hansmann as soon as possible in order to make appropriate arrangements for classwork or taking of examinations.

Disclaimer: I reserve 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, scheduled dates, and fraction(s) of the final grade assigned to individual items within the course. Although your attendance at the lecture is not required, you are responsible for any announcements made in class, including changes in the quiz and examination schedule, course content, assignments, scheduled dates, and fraction(s) of the grade assigned to individual items within the course. If changes become necessary, I will announce them as early as possible.

Last update: Aug. 20, 2016