

SYLLABUS
Chem 534
Spring 2017

Statistical Mechanics: Classical and quantum statistical mechanics with applications to chemistry, spectroscopy, and physics.

INSTRUCTOR: Prof. K W Higgs (N116B) 335-3033 higgs@wsu.edu. Office Hours by appointment.

TEXTBOOKS: **Statistical Mechanics.** Norman Davidson (Available from Amazon as a Dover book).

TOPICS:

Chapter 2. Review of Classical Mechanics (Newtonian, Lagrangian, and Hamiltonian)
Chapter 3. Review of Quantum Mechanics
Chapter 4. Review of Thermodynamics
Chapter 5. Mathematics

EXAM 1

Chapter 6. Stat Mech of independent systems
Chapter 7. Chemical equilibrium
Chapter 8. Atoms and diatomic molecules

EXAM 2

Chapter 9. Isotope effects
Chapter 10. Classical Stat Mech
Chapter 11. Polyatomic Molecules

EXAM 3

Chapter 12. Black body radiation
EXTRA Fermi Energy in metals
Chapter 13. Canonical and grand canonical ensembles
Chapter 14. Fluctuations, noise, and Brownian motion
MAYBE Crystals

EXAM 4

EXAMS: Four exams.

HOMEWORK: Graded, assigned by chapter or parts of a chapter.

FINAL GRADE: Homework.....25%
Class Participation 5%
Exams.....70%

TOTAL.....100%

GENERAL: It has been shown that in a simple lecture setting students only learn about 10% of what they are told. If the students stay active in participating in class, that can be pushed to about 50% but the amount of material covered decreases considerably. Moreover, in the time we have for lecture, I will only be able to talk about 25 to 30% of what is in the text. Bottom line is that I am not going to be able to pour knowledge into your head – you are going to have to pack it in. So, read the chapter BEFORE coming to class and be prepared to ask questions. Do the homework until you can do it with the book closed. Stay awake and ask questions in class. Participate in the classroom exercises. And remember, you are not learning the material for my exams, you are learning it for prelims and for life!

Homework: Homework assignments will be assigned almost every Tuesday and will usually be due the Tuesday of the following week (i.e., you will have about 7 days to complete each homework. **You are encouraged to work in groups.** I hope that you will use the group homeworks as a vehicle for cooperative teaching and learning as well as a time-saving device. However, I do not want to see ‘carbon copies’ of the homework. Some students fall into a trap of letting other members of their group do the hard intellectual work and think that they can catch up in time to take the exams. Of course, this is not only a mistake and not an effective way to learn—it is also bad manners.

You will be allowed **one** late homework. I will drop the two lowest homework grades.

Final Grade: The grade will be determined by:

Homework (25%):

Homework will tend to test problem solving ability. I will hand grade two or three of the assigned problems and your grade will be based on those problems.

Homework is VERY important. Ideally you would do each problem until you can do them all with the book closed.

Class Participation (5%)

At the start of many classes, students will be selected to demonstrate and discuss the solution of a problem. Scores will be awarded based on your contributions to this effort.

Exam 1 through 4 (70%)

Each exam is worth 17.5% of the final grade. One of the four exams will be takehome. Please do not become complacent that you can find solutions to the questions without actually having to learn the material. Takehome exams tend to be longer and more difficult than in class exams. Statistical thermodynamics is a subject that must be digested slowly. Please try to keep up and work at a constant rate. Last minute studying for an exam is usually a recipe for poor performance. All exams are cumulative.

Time Management: This is a 3 credit course. You are expected to spend 3 waking hours a week in lecture. You should be spending a minimum of nine hours a week reviewing lecture material, reading text book(s), doing homework, and studying for exams.

Pre-Class Reading: *You are expected to have read the appropriate chapter in your book PRIOR to coming to class.* You should be doing two to three hours a week of reading. If a concept in Davidson is unclear to you, find readings on your own that supplements these hard parts. You may find one of Terrell Hill’s books useful, and they are also available from Dover.

Additional Reference Material: Will be provided as appropriate.

Academic Integrity: Cheating of any kind is unacceptable. This includes the inappropriate use of solution manuals for homework sets, as well as the usual forms of copying, etc. Cooperative learning is encouraged, but all work submitted for grading must be your own. All instances of cheating will be reported to Student Affairs and the Dean of Students. The assignment in question will receive no credit. Students who violate WSU's Standards of Conduct for Students will receive an F as a final grade in this course, will not have the option to withdraw from the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions.” The standards of Conduct for Students can be found at <http://conduct.wsu.edu>.

Students with Disabilities: Reasonable accommodations are available for students with documented disabilities or chronic medical conditions. If you have a disability and need accommodations to fully participate in this class, please visit the Access Center website to follow published procedures to request accommodations: <http://www.accesscenter.wsu.edu>. Students may also either call or visit the Access Center in person to schedule an appointment with an Access Advisor. Location: Washington Building 217; Phone: 509-335-3417. All disability related accommodations MUST be approved through the Access Center. **Please notify the me during the first week of class of any accommodations needed for the course.** Late notification may cause the requested accommodations to be unavailable. .

Safety on Campus: WSU has developed resources for the safety of students, faculty, staff and visitors. These are the Campus Safety Plan at <http://safetyplan.wsu.edu> and the university emergency management at <http://oem.wsu.edu/>. You should also become familiar with the WSU ALERT site at <http://alert.wsu.edu> for information about emergencies affecting WSU. It is recommended that you go to the zzusis portal at <http://zzusis.wsu.edu> and **register your emergency contact information** for the Crisis Communication System (CCS).