

Fall 2016 syllabus

(as of July, 2016, please watch for an updated version in September)

Thermodynamics & Kinetics

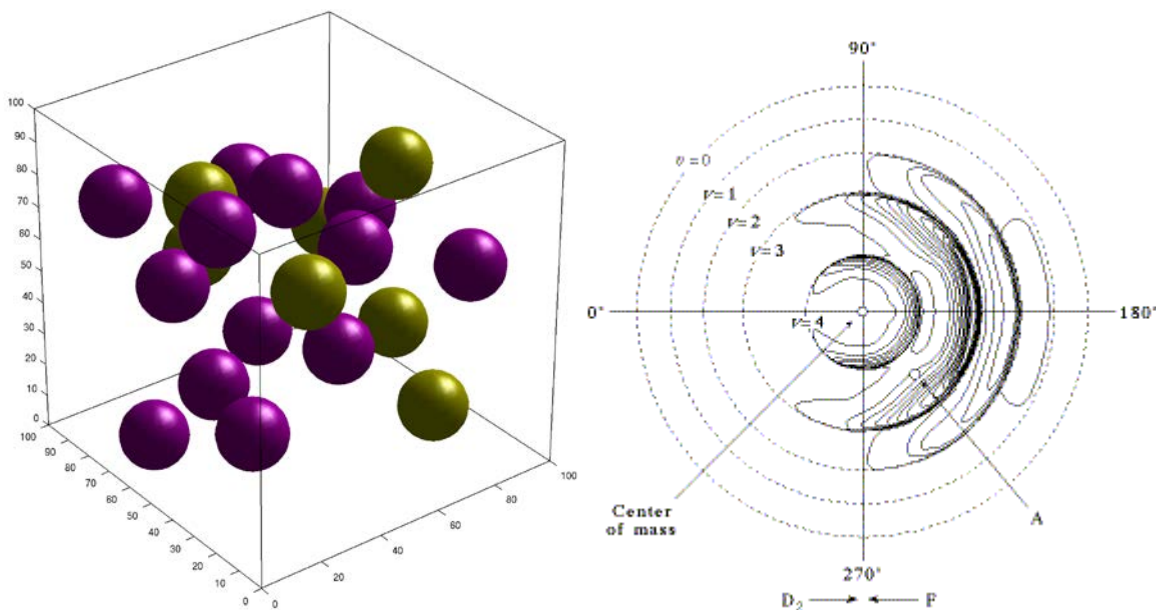
CHEM-UA 652 Thermodynamics and Kinetics (4 points)

Lectures: Tue, Thu 9.30 AM - 10.45 AM

09/06/2016 - 12/16/2016 at SILV 520

Instructor: Prof. Alexej Jerschow

Develops the connection between thermodynamic quantities (energy, entropy, etc) and molecular properties and reaction kinetics. Topics include properties of gases, classical thermodynamics, and kinetics.



Prerequisites:

- Math-UA 0122 and
- Phys-UA 0012 Or Phys-UA 0093 and
- Chem-UA 0102 or Chem-UA 0104 or Chem-UA 0110 or Chem-UA 0112 or Chem-UA 0126 or
 - Scien-AD 107 and Scien-AD 108 and Scien-AD 110
- with a minimum grade of C..

in other words: Two semesters of General Chemistry, two semesters of university introductory physics (with calculus), and at least two semesters of university calculus.

Office hours

Tuesdays 10:45am-12:00pm, or by appointment in Silver 710 (office phone: 88451)
(Alexej.Jerschow@nyu.edu)

Course materials

- Book: "Physical Chemistry: A Molecular Approach", McQuarrie and Simon, University Science Books, 1997; the Solutions Manual to that book may be useful as well.
- Additional course materials will be posted on the NYU Classes page.

Homework

Homework will be posted on the NYU Classes page. Homework is due at the beginning of the following recitation section.

Assigned Reading

Some additional materials for deeper and more detailed discussions will not be covered in full in class, but will be assigned as reading materials, and will be part of the course material tested at the exams / HW, and quizzes.

Quizzes

6-8 Quizzes will be given during recitation. Quizzes will not be announced. They will be composed of 2-3 questions similar to recent HW questions. Only calculator allowed. Common equations and constants will be provided. You can miss two quizzes for whatever reason without penalty.

Exams

Only calculator allowed. Common equations and constants will be provided.

Grading

1st exam – 22.5%
2nd exam – 22.5%
Final Exam – 30%
Quizzes – 15%
Homework – 10%

Course Outline

Sep 6	Introduction to the Course, start Ch 16
Sep 8	Ch 16: The Properties of Gases
Sep 13	
Sep 15	Ch 19: The First Law of Thermodynamics
Sep 20	
Sep 22	Ch 20: Entropy and the Second Law of Thermodynamics
Sep 27	
Sep 29	Ch 21: Entropy and the Third Law of Thermodynamics

Oct 4	
Oct 6	First Midterm Exam
Oct 11	Ch 22: Helmholtz and Gibbs Energies
Oct 13	
Oct 18	Ch 23: Phase Equilibria
Oct 20	Ch 24: Liquid-Liquid Solutions
Oct 25	
Oct 27	Ch 25: Solid-Liquid Solutions
Nov 1	
Nov 3	Ch 26: Chemical Equilibrium
Nov 8	
Nov 10	Second Midterm Exam
Nov 15	Ch27: Kinetic Theory of Gasses
Nov 17	Ch28: Chemical Kinetics I: Rate Laws
Nov 22	Cj 29: Chemical Kinetics II: Reaction Mechanisms
<i>Nov 24</i>	<i>Thanksgiving, no class</i>
Nov 29	Ch30: Gas-Phase Reaction Dynamics
Dec 1	Ch 31: Solids and Surface Chemistry
Dec 6	
Dec 8	Statistical Thermodynamics Topics from Ch 17, 18, 20, 21, 23, 25, 26
Dec 13	
Dec 15	
Dec 20	8am – 9:40 am Final Exam

Exams

First Midterm, Oct 6, 9:30-10:45am

Second Midterm, Nov 10, 9:30-10:45am

Final Exam Tue. Dec 20, 8:00 AM - 9:40am

Recitations

You need to be registered for one of the recitation sections for this course (UA652 sections 103 / 104).

Note: no recitation on Monday, Oct 10 (Fall recess)

Section: 103

Mon 11.00 AM - 12.15 PM at WAVE 370

Section: 104

Mon 12.30 PM - 1.45 PM at WAVE 370

Missed Exams / Quizzes

If you will miss the first or second examinations because of illness, you must contact Professor Jerschow by email **before the start of the exam** and provide a doctor's note explaining your absence. **No make-up exam** will be given for these, but the exam grade will be composed only of the exams taken.

A make-up will be given **for the final exam only** under exceptional circumstances that must be discussed with Professor Jerschow prior to the exam. In the rare cases where approval is granted, a grade of incomplete will be given for the course and the make-up will be scheduled for the Spring 2015 semester.

Software

The use of plotting and/or math software is strongly encouraged (one of these: MATLAB / Mathematica / Origin / Excel / Python / Octave / Scilab / LoggerPro), as it will be very helpful in the course. (note that while Excel can be used to plot functions, it is by far the least convenient one to use for this purpose).

For example, MATLAB is available for free via the VCL:

- 1) log in into home.nyu.edu, click "**VCL Login**" button at the bottom left corner, there will be a new page generated.
- 2) click "**Log In to the VCL NOW!**", you will see ***** Files saved to the VCL will be deleted when quitting an application. To ensure that you retain your files, save them to your local hard drive. *****
- 3) enter your **NetID and password**, LOG IN.
- 4) find MATLAB and click it, you will be asked to **install a Plug In**, Just install it and click MATLAB again, you will go into matlab.
- 5) after your file is done, save it to your **local hard drive!** To run the file on vcl matlab, choose add to path so that it can be found.

Octave, Python, and Scilab are freely available.

Course Site

The main course site is the NYU Classes page.

Tutoring

The University Learning Center provides free peer tutoring:

<https://www.nyu.edu/students/undergraduates/academic-services/undergraduate-advisement/academic-resource-center/tutoring-and-learning.html>