CHEM*2820 Course Outline Fall 2015

Updated Sept. 6, 2015

Course: Thermodynamics and Kinetics

Text: Physical Chemistry, by P. Atkins and J. De Paula 9th Ed.

CHEM*2820 Lecture Notes (2015), by P. Tremaine

Instructor: Prof. Peter Tremaine (tremaine@uoguelph.ca)
Rm. 314 B MacN. Office (Ext 56076)
Rm. 309 MacN. Lab (Ext 53811)
Office hours: Thursday 1:30 - 3:00 pm

Lab Coordinator: Dr. Kate Stuttaford (kstuttaf@uoguelph.ca)
Rm. 3113A SSC Office (Ext. 54861)

Lectures:	Tues. 8:30 - 9:50 am	Room 403 Crop Science
	Thurs. 8:30 - 9:50 am	Room 403 Crop Science
Tutorials	Tues. 5:30 - 7:00 pm	Room 318 MacNaughton
	(Sept. 29 & Alternate Weeks)	
Laboratories	Tues. 2:30 - 5:20 pm	Room 2101 SSC
	Wed. 2:30 - 5:20 pm	Room 2101 SSC

Prerequisite(s): CHEM*1050, (MATH*1210 or MATH*2080)

Course Content

1. The Gas Laws
2. Thermodynamics
3. Non-Electrolyte Solutions
4. Chemical Equilibrium and Dynamics
5. Kinetic Theory of Gases
6. Chemical Kinetics

Evaluation:

• Assignments	10%	Every 2 weeks, total of 5 Assignments
• Mid-Term Exam	20%	Tues. Nov. 3, 5:30 - 7:00 pm, MacN 318
• Lab. Reports	30%	Due one week after each lab
• Final Exam	40%	Dec. 9, 8:30 am - 10:30 am, Location TBA

- A mark below 40% on the final exam will fail the course.

Assignments must be done individually, or in pairs with permission. Use of laptops in class requires written permission.

CHEM*2820: Thermodynamics and Kinetics
Course Objectives

Degree Context:

This is a required course for the Honours BSc programs in Chemistry and Chemical Physics. The course is usually taken in the 5th semester.

Teaching Objectives:

CHEM 2820 is intended to provide a background in the fundamentals of chemical thermodynamics and kinetics, and their applications to modern science. The material is presented at a level of depth that will allow it to be used as a foundation for further study. Topics in thermodynamics include ideal and non-ideal gases, the three laws, physical transformations of pure substances, simple mixtures, and chemical equilibrium. The latter part of the course includes the kinetic theory of gases, transport properties and chemical kinetics.

Mathematical Background:

One course each on differential and integral calculus is required (MATH 1000 or 1080, or 1200; and MATH*1210 or 2080). Key concepts and formulas are summarized in sections interspersed between chapters in the 9th edition of Atkins and De Paula. While problems can be done with a calculator, familiarity with Excel spreadsheets is helpful.

Reserve Materials:

Two copies each of

> **"Student Solutions Manuals to Accompany Physical Chemistry, 9th ed.", by P. Atkins, C, Trapp, C. Guinta and M. Cady (Oxford Univ. Press, 2010)**
>
> **"Excel for Chemists" by E. J. Bilo (Wiley, N.Y., 2001)**

are on reserve in the library for CHEM 2820.