

Chemistry 2290
Chemical Energetics and Dynamics
Winter 2017

Instructor: Prof. Kathleen Gough
Room 378 Parker
474-6262

Office Hours:
Email for an appointment
Kathleen.Gough@umanitoba.ca

Labs: Instructor **Dr. Carl Bartels, Parker 562**

Text: *Physical Chemistry, 3rd edition* by Engel and Reid (also used for Chem 2280)

In Chemistry 2290, we will study thermodynamics and its applications to chemistry. In order to describe these principles, a good command of mathematics is essential! A background in calculus (including differentiation and integration) is strongly recommended for this course. Further updates to this syllabus will be provided in November 2016.

Topics to be covered:

- 1) **Equations of state** (Chapters 1, 7)
-definitions, ideal gases, van der Waals equation, virial equation, law of corresponding states
- 2) **Fundamental concepts of thermodynamics** (Chapters 2-6)
-work, heat, internal energy, first law, heat capacity, enthalpy, Hess' law, entropy, second law, third law, Gibbs and Helmholtz energies, Maxwell relations
- 3) **Phase equilibria** (Chapter 8)
-phase boundaries, phase diagrams, Clapeyron equation, Clausius-Clapeyron equation
- 4) **Chemical equilibria** (Chapter 6)
-equilibrium constant, Le Chatelier's principle, van't Hoff equation
- 5) **Solutions** (Chapters 9-10)
-ideal and nonideal solutions, Gibbs-Dunhem equation, Raoult's law, Henry's law, colligative properties, solvent and solute activity

Some notes about taking notes in Chem 2290

The textbook is a valuable resource to help clarify concepts from class but you'll find that it will cover topics in a different order and in a different amount of detail.

A good set of lecture notes is the best way to prepare for assignments and exams.

**Note that to pass the course, you must obtain a minimum grade of 50% in the lab component and a minimum grade of 50% on the lecture material (midterms, final exam and problem sets).

You are expected to complete all lab assignments on time and participate in all lab activities. Further information is available during your first lab period.