Chemistry 232. Physical Chemistry II

Instructor: Derek Leaist (dleaist@stfx.ca)
Office PSC 3072, Lab PSC 3020

Lectures: Monday 8:15 am, Tuesday 10:15 am, Thursday 9:15 am
(MULH 3030, Blocks A1/A2/A3)

Labs/Tutorials: Friday 2:15 pm (Lab PSC 3037/Tutorial PSC 1072, Blocks 08/X8)

Course Notes: Moodle pages and **https://people.stfx.ca/dleaist/Chem232/**

(tutorial problems and answers, problem assignments and tests from 2016-2021, equations sheets, and reading material also posted)

Textbook: (optional) ***Thermodynamics, Statistical Thermodynamics and Kinetics***, 3rd Edition, Thomas Engel and Philip Reid

Course Outline

Chapter 9. Ideal and Real Solutions

Chapter 10. Electrolyte Solutions

Chapter 11. Electrochemical Cells, Batteries and Fuel Cells

Chapter 16. Kinetic Theory of Gases

Chapter 17. Transport Processes (Diffusion, Heat Flow, Viscosity Electrical Conductivity)

Chapter 18. Elementary Chemical Kinetics

Chapter 19. Complex Reactions

(*about five lectures per Chapter*)

Chem 232 Course Material

Why are these topics important and worth studying?

- solution thermodynamics
- real and ideal solutions
- colligative properties
- phase diagrams
- electrolyte solutions
- electrochemical cells
- batteries
- fuel cells
- kinetic theory of gases
- velocity distributions
- speed distributions
- effusion
- molecular collisions
- mean free path
- non-equilibrium systems
- diffusion
- heat conduction
- viscosity
- ionic conduction
- reaction rates
- rate laws
- reaction mechanisms
- parallel reactions
- sequential reactions
- activation energy
- reversible reactions
- relaxation rates

Marking Scheme

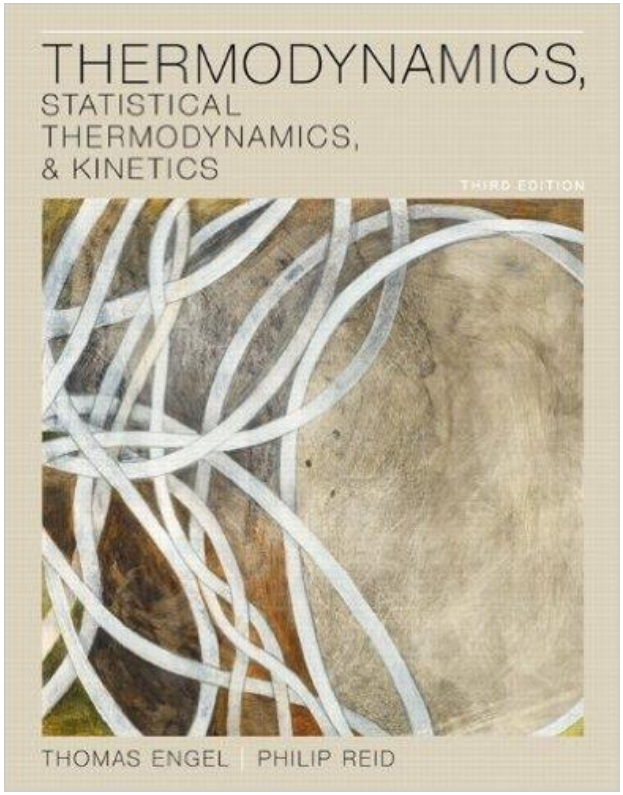
Assignments (about eight)	10 %
Labs (five, bi-weekly)	15 %
Term tests (two, 15 % each)	30 %
Final Exam	45 %
	100 %

Term tests: **Friday 11 February**
Friday 25 March

Final exam: date TBA (April exam period)

Chem 232 Lab/Tutorial Schedule (2022)

Friday	Lab (PSC 3037) or Tutorial (PSC 1072)
Jan. 07	**Lab #1.** Dissociation Constant of a Weak Acid
Jan. 14	**Tutorial #1**
Jan. 21	**Lab #2.** Dissociation of an Iron (II) Complex
Jan. 28	**Tutorial #2**
Feb. 04	**Lab #3.** Primary Kinetic Salt Effect
Feb. 11	**Tutorial #3** and **Term Test 1**
Feb. 18, 25	no lab or tutorial
March 04	**Lab #4.** Phase Diagrams from Cooling Curves
March 11	**Tutorial #4**
March 18	**Lab #5.** Partial Molar Volumes
March 25	**Tutorial #5** and **Term Test 2**
April 01	**Tutorial #6**



Same textbook used previously.
Used copies may be available.

Textbook (optional)

(for Chem 231 and Chem 232)

Thermodynamics, Statistical Thermodynamics and Kinetics

3rd Edition ($126 Amazon.ca)

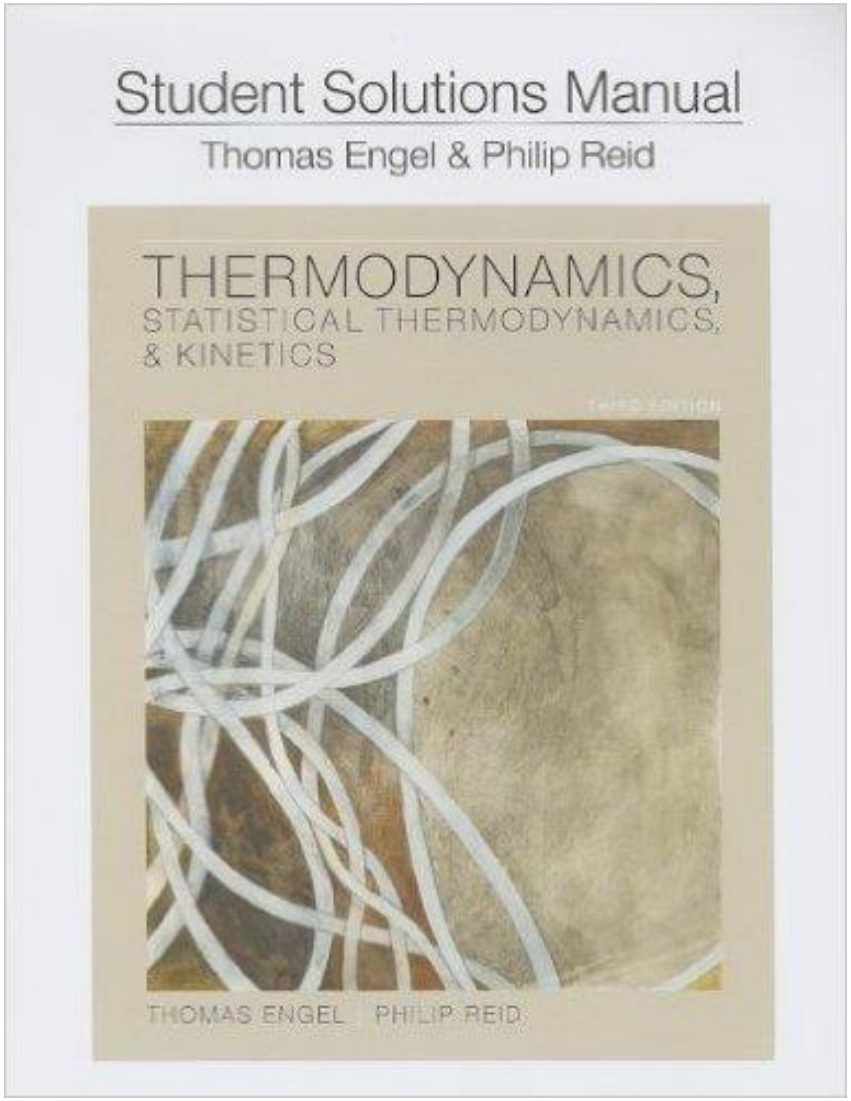
Thomas Engel and Philip Reid

available with "free" online Mastering Chemistry resource material

or ***Physical Chemistry***, 3rd Edition,
Thomas Engel and Philip Reid

includes chapters on quantum mechanics and spectroscopy for Chemistry 331 and 332
(but not required for these courses)

Available online with a Google account:
https://www.academia.edu/14903550/Thermodynamics_Statistical_Thermodynamics_and_Kinetics_THIRD_EDITION



Student Solutions Manual

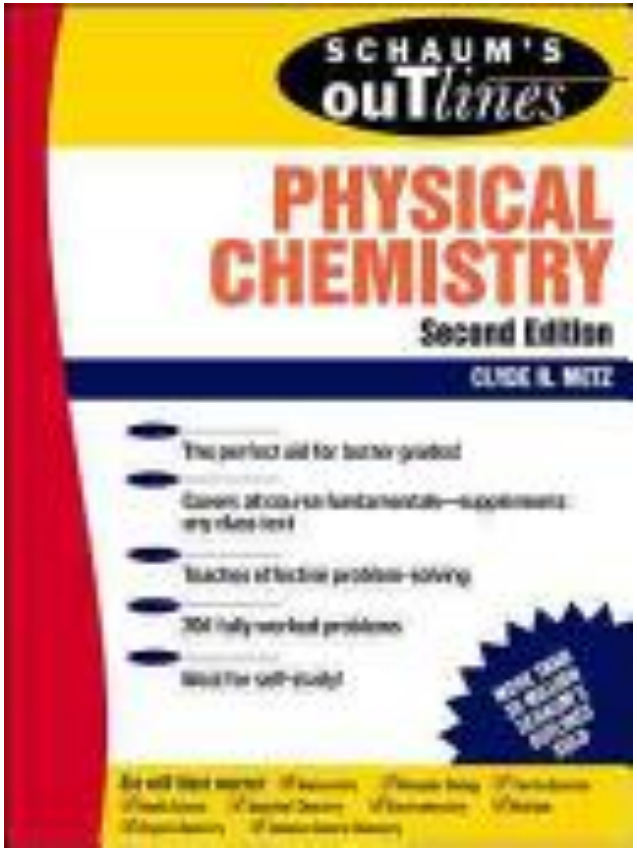
(for Chem 231 and Chem 232)

Thermodynamics, Statistical Thermodynamics and Kinetics

3rd Edition ($34 Amazon.ca)

Thomas Engel and Philip Reid

worked solutions to
end-of-chapter problems



Schaum's Outline of Physical Chemistry

2nd edition ($25 Amazon.ca)

Clyde A. Metz

Thermodynamics, electrochemistry, kinetics, and transport properties for Chem 231 and Chem 232.

concise summaries, worked problems.

Also covers: quantum mechanics
spectroscopy
crystallography
polymers

Chem 232: Course Material

Moodle pages and course website https://people.stfx.ca/dleaist/Chem232/

- lab and tutorial schedule
- course notes
- tutorial problems with answers
- problem sets with answers from 2016, 2017, 2018, 2019, 2020, 2021
- term tests with answers from 2016, 2017, 2018, 2019, 2020, 2021
- equation sheets
- pdf copy of the textbook: T. Engel, P. Reid, ***Thermodynamics, Statistical Thermodynamics and Kinetics***, 3rd Ed., Pearson, Boston, 2013.