



UNIVERSITY OF CALGARY

DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS
WINTER 2015

COURSE: CHEMISTRY 471, Physical Chemistry: Kinetics and Spectroscopy

LEC	DAYS	TIME	ROOM	INSTRUCTOR	OFFICE	PHONE	EMAIL @ucalgary.ca	OFFICE HOURS
L01	MWF	12:00-12:50	ST 130	Prof. Simon Trudel	SB 417	210-7078	trudels	MWF 13:00-13:30
T01	Tu	9:30-10:20	KNB 129	Prof. Simon Trudel	SB417	210-7078	trudels	n.a.
T02	F	9:00-9:50	ST 063	t.b.d.	t.b.d.	t.b.d.	t.b.d.	n.a.

TEXTBOOK: *"Physical Chemistry"*, 3rd Edition, by Engel and Reid, Pearson

TOPICS COVERED AND SUGGESTED READING:

Kinetics Section

Collision theory (**Chapter 33, Sections 6-7**)

Arrhenius behaviour (**Section 35.9**)

Kinetics of complex reactions (**Chapter 35, Sections 7, 8, 10**)

Diffusion (**Sections 34.2 & 34.3**) & Diffusion-limited reactions (**Section 35.15**)

Potential energy surfaces and activated complex theory (**Sections 35.13 & 35.14**)

Examples taken from Chapter 36

Molecular spectroscopy Section

Introduction to spectroscopy (**Section 19.1**)

Rotational and Vibrational Spectra (**Chapter 19, Sections 3-6**)

Electronic Spectroscopy (**Chapter 25, Sections 1,3-8**)

Spontaneous emission (**Section 19.2**) & lasers (**Section 22.7**)

Nuclear magnetic resonance spectroscopy (**Chapter 28, Sections 1-9**)

LABORATORY EXPERIMENTS

The Kinetics of Acetic Anhydride Hydrolysis

Determination of the Bond Dissociation Energies of Bromine and Iodine from their Absorption Spectra

The Effects of Solvent Environment on Fluorescence Spectra

Independent Kinetics or Spectroscopy Project

EXPECTED PREREQUISITES AND SUGGESTED READING

Introduction to Kinetics, reaction rates, rate laws, and integrated rate laws (**Chapter 35, Sections 1-3, 5**)

The Schrödinger equation (**Chapter 13, Sections 4-6**)

Harmonic oscillator and the rigid rotor (**Chapter 18**)

Molecular Symmetry (**Chapter 27, Sections 1-6**)

Department Approval: Approved by Department

Date: December 2, 2014