UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS
WINTER 2017

1. **Course: CHEMISTRY 471, Physical Chemistry: Kinetics and Spectroscopy**

LEC	DAYS	TIME	ROOM	INSTRUCTOR	OFFICE	EMAIL @ucalgary.ca	OFFICE HOURS
L01	MWF	12:00-12:50	SS 109	Prof. Simon Trudel	SB 417	trudels	MWF 13:00-13:30
T01	Tu	9:30-10:30	SA 109	Roxanne Jackson	SA 156	rjjackso	t.b.d.
T02	F	9:00-10:00	SS006	Prof. Simon Trudel	SB 417	trudels	MWF 13:00-13:30

Desire 2 Learn (D2L) CHEM 471 L01 – (Winter 2017)
Departmental Office: Room SA 229, Tel: 403-220-5341, e-mail: uginfo@chem.ucalgary.ca

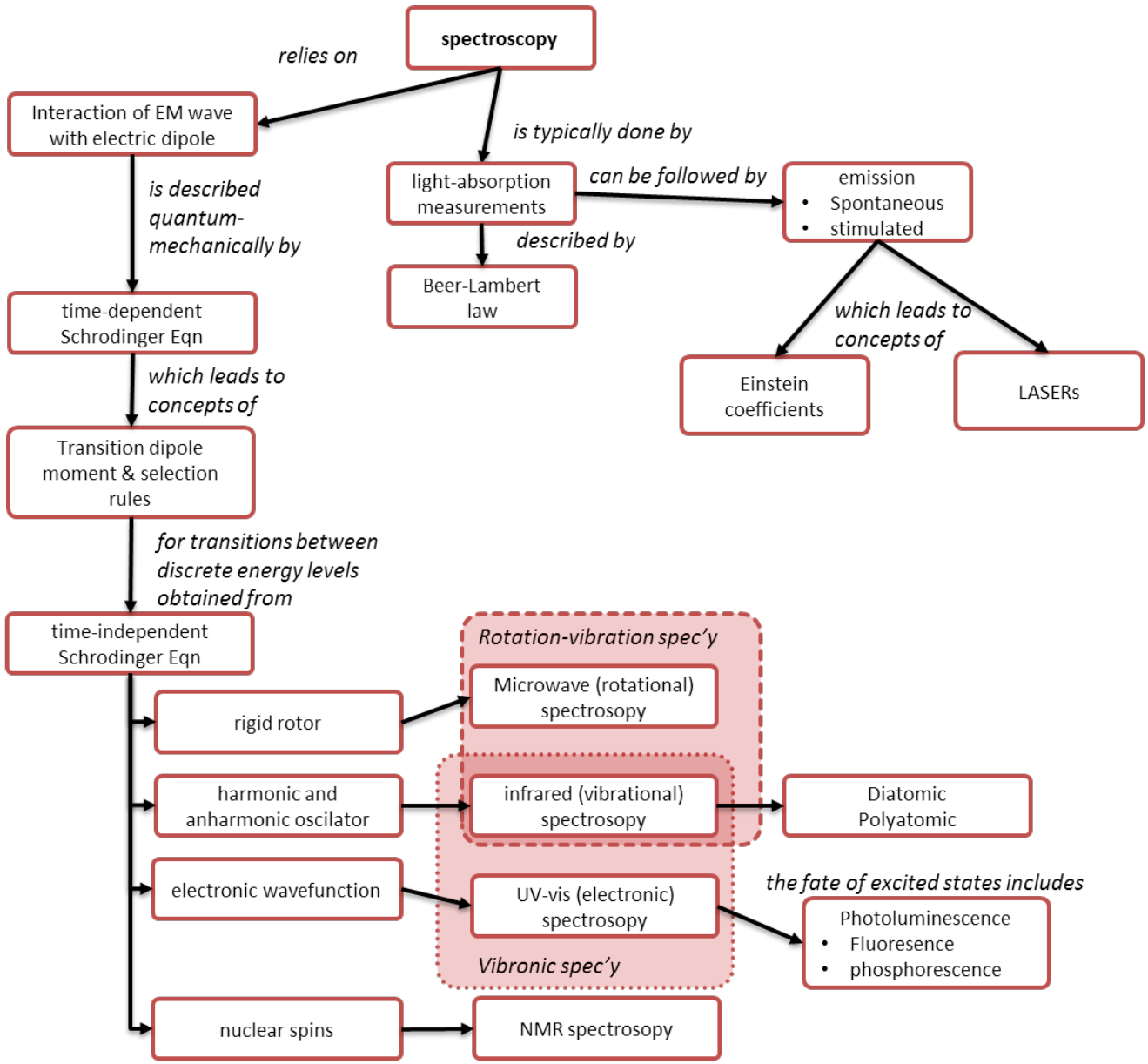
2. **Course Description:** Vibrational, electronic and magnetic resonance spectra. Reaction kinetics and transport properties in the gas phase and in solution. Catalysis. Laboratory: Experimental measurements, interpretations, and calculations relating to the topics discussed in lectures.

3. **Recommended/ Required Textbook(s):** *"Physical Chemistry",* 3rd Edition, by Engel and Reid, Pearson

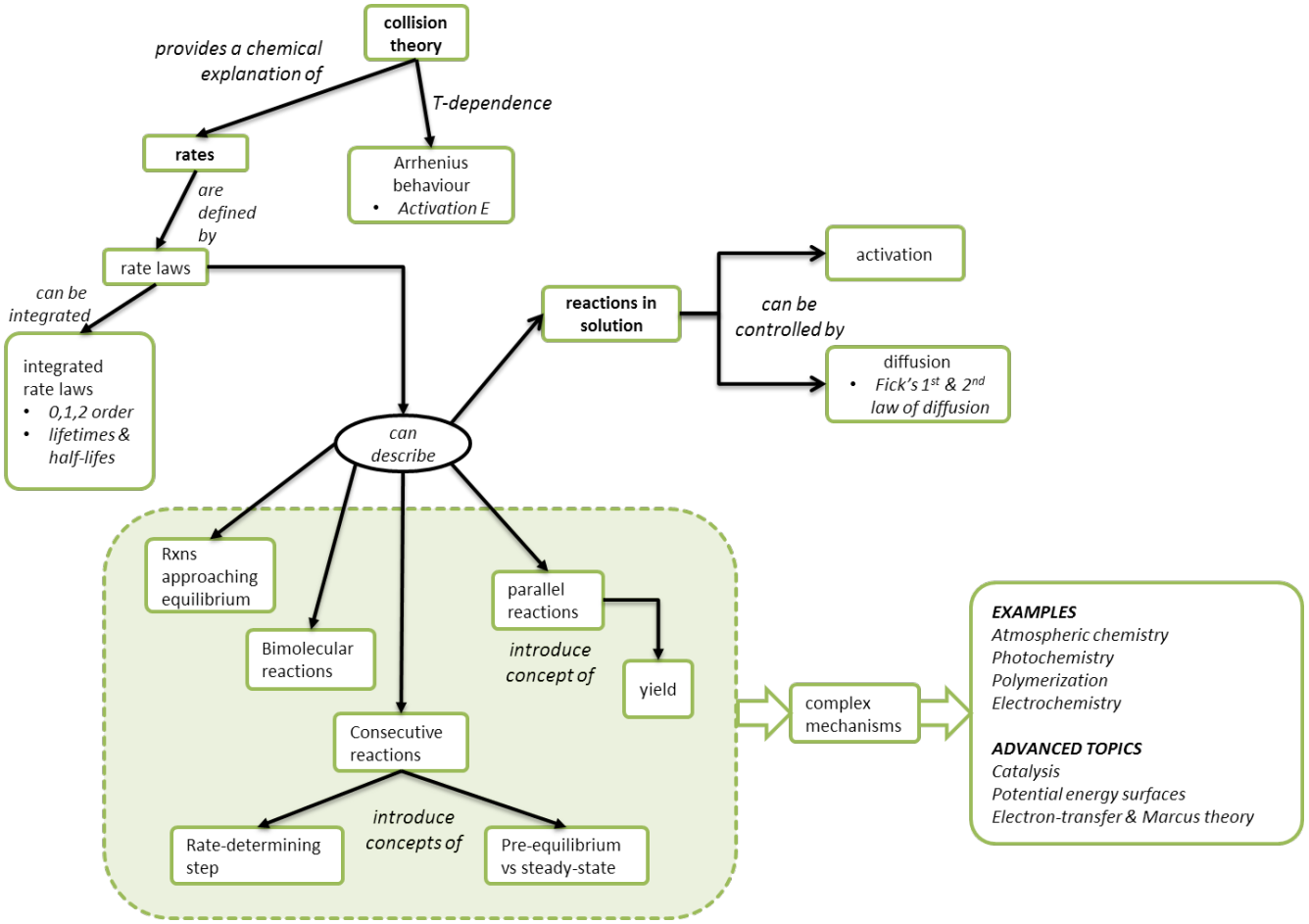
4. **Topics Covered and Suggested Readings:**

Course Content	**Chapter in Textbook** *(not all sections will be covered)*
Kinetics Section	
Collision theory	**Chapter 33, Sections 6-7**
Arrhenius behavior	**Section 35.9**
Kinetics of complex reactions	**Chapter 35, Sections 7, 8, 10**
Diffusion & Diffusion-limited reactions	**Sections 34.2 & 34.3** & **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 & lasers	**Section 19.2 and 22.7**
Nuclear magnetic resonance spectroscopy	**Chapter 28, Sections 1-9**

CHEM 471 Concept map: Spectroscopy



CHEM 471 Concept map: Kinetics



4. **Laboratory Experiments:** (12 weeks, 3 hours/ week)

The Kinetics Isotope Effect

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

Department Approval: Approved by Department Head Date: December 20, 2016