

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

1. COURSE: CHEMISTRY 521 – Introduction to Atmospheric Chemistry

LEC	DAYS	TIME	ROOM	PROFESSOR	OFFICE	PHONE	EMAIL	OFFICE HOUR
L01	TuTh	11:00-12:15	MS 211	Dr. Hans Osthoff	SB 205	220-8689	hosthoff@ucalgary.ca	TuTh 12:30- 13:30

Desire2Learn (D2L): CHEM 521 L01 - (Winter 2017) - Introduction to Atmospheric Chemistry, https://d2l.ucalgary.ca/d2l/home/171366

Departmental Office SA 229, (403) 220-5341, e-mail: uginfo@chem.ucalgary.ca

2. Course Description: An introduction to tropospheric and stratospheric chemistry. The detailed chemistry of the stratosphere and troposphere; gas-phase chemical kinetics; photochemistry and atmospheric radiation; aerosols; anthropogenic pollution and air quality; climate forcing; introduction to modelling and atmospheric transport

3. TEXTBOOKS:

Required:

"Introduction to Atmospheric Chemistry", Daniel J. Jacob, Princeton University Press (1999) available for download at http://acmg.seas.harvard.edu/people/faculty/djj/book/index.html or for purchase at the University bookstore

Recommended:

"Chemistry of the Upper and Lower Atmosphere", Barbara Finlayson-Pitts, James Pitts, Academic Press (2000)

4. TOPICS COVERED AND SUGGESTED READING:

Measures of atmospheric composition: Mixing ratio, number density and partial pressure	Chapter 1, DJ
Atmospheric pressure, structure, sea-breeze and Hadley circulation	Chapter 2, DJ
Gas-phase kinetics: Bimolecular reactions, 3-body reactions, chemical equilibria	Chapter 9, DJ Chapter 5, BFP
Atmospheric photochemistry: Actinic Flux, calculation of photolysis rate constants	Chapters 3 BFP
Simple models: Box and puff models	Chapter 3, DJ
Stratospheric ozone: Chapman mechanism, catalytic loss cycles, polar ozone loss, aerosols	Chapter 10, DJ Chapter 12, BFP
Oxidizing power of the troposphere: OH and HOx, global CO, CH4, NOx, and O3 budgets	Chapter 11, DJ Chapters 6+7, BFP
Ozone air pollution; production efficiency and control strategies	Chapter 12, DJ Chapter 16, BFP
Acid rain	Chapter 13, DJ Chapter 8, BFP
Aerosols: Sources, sinks, size distributions, chemical composition radiative effects	Chapter 8, DJ Chapter 9, BFP

Greenhouse effect and global climate

Chapter 7, DJ Chapter 14, BFP

This course does **not** have a laboratory component.

Department Approval: Approved by Department Head

Date: December 20, 2016