



UNIVERSITY OF CALGARY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS
SPRING 2020

1. COURSE: CHEMISTRY 701.67 – Independent Study: Topic Atmospheric Chemistry

LEC	DAYS	TIME	ROOM	PROFESSOR	OFFICE	PHONE	EMAIL	OFFICE HOUR
L01	-	-	-	Dr. Hans Osthoff	-	-	hothoff@ucalgary.ca	via email only

Desire2Learn (D2L): CHEM 701 L01 - (Spring 2020) - Independent Study, <https://d2l.ucalgary.ca/d2l/home/315525>
Departmental Office SA 229, (403) 220-5341, e-mail: uginfo@chem.ucalgary.ca

2. **Course Description:** An online graduate course in atmospheric chemistry.

3. **TEXTBOOKS:**

Required:

"Introduction to Atmospheric Chemistry", Daniel J. Jacob (**DJ**), 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 or via the University of Calgary library web site via <https://app.knovel.com/web/toc.v/cid:kplAC00011/viewerType:toc/>

"Atmospheric Chemistry and Physics: From Air Pollution to Climate Change", 2nd ed., John H. Seinfeld and Spyros H. Pandis (**JS/SP**), Wiley (2006), ISBN 9780471720188. This book is available via the University of Calgary library web site via <http://ebookcentral.proquest.com.ezproxy.lib.ucalgary.ca/lib/ucalgary-ebooks/reader.action?docID=1120465>

Recommended:

"Chemistry of the Upper and Lower Atmosphere", Barbara Finlayson-Pitts, James Pitts (**BFP/JP**), Academic Press (2000), ISBN 978-0122570605. This book is available via the University of Calgary library web site via <http://ebookcentral.proquest.com.ezproxy.lib.ucalgary.ca/lib/ucalgary-ebooks/reader.action?docID=317000>.

4. **TOPICS COVERED AND SUGGESTED READING:**

Topic	DJ	BFP/JP	JS/SP
Measures of atmospheric composition: Mixing ratio, number density and partial pressure	Ch. 1	Ch.1 and 2D	Ch. 1.6
Atmospheric pressure, structure, and transport; sea-breeze and Hadley circulation	Ch. 2 and 4	Ch. 2B	Ch.1.3-1.5, 21.1-21.3; 16.1-16.2
Gas-phase kinetics: Bimolecular reactions, 3-body reactions, chemical equilibria	Ch. 9	Ch. 5	Ch. 2.1 and 3
Atmospheric photochemistry: Actinic Flux, calculation of photolysis rate constants	Ch. 9.3	Ch. 3-4	Ch. 4
Simple models: Box and puff models	Ch. 3		Ch. 25
Stratospheric ozone: Chapman mechanism, catalytic loss cycles, polar ozone loss, aerosols	Ch. 10	Ch. 12	Ch. 5
Oxidizing power of the troposphere: OH and HO _x , global CO, CH ₄ , NO _x , and O ₃ budgets	Ch. 11	Ch 6-7	Ch. 6
Ozone production efficiency and control strategies	Ch. 12	Ch. 16	Ch. 6
Acid rain	Ch. 13	Ch. 8	Ch. 7
Aerosols	Ch. 8	Ch. 9	Ch. 8-15
Greenhouse effect and global climate	Ch. 7	Ch. 14	Ch. 23-24

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

Department Approval:

Electronically Approved

Date: April 28, 2020