

**Atmospheric Chemistry**  
**CHEM 3410**  
**Spring Quarter, 2020**

- Instructor:** Dr. J. Alex Huffman  
**Zoom Office:** <https://udenver.zoom.us/my/alexhuffman>  
**Contact Info:** Email – [alex.huffman@du.edu](mailto:alex.huffman@du.edu)  
**Office Hours:** Will be conducted via Dr. Huffman Zoom office (link above); times TBD
- Class Time:** MWF, 10:00 – 10:50 AM  
**Class Location:** Remote via Zoom, Canvas (both live/synchronous and recorded/asynchronous)  
Zoom lecture room: <https://udenver.zoom.us/j/947178134> (same link in Canvas)
- Zoom:** I strongly recommend you download the Zoom app for better control during live meetings/lectures: <https://udenver.zoom.us/>
- Textbooks:** No textbook are required for purchase for this course.
- We will make use of the following textbook, which is available for free at the site linked below:  
Daniel J. Jacob  
*Introduction to Atmospheric Chemistry*  
Published: 1999, Princeton University Press  
ISBN-13: 978-0691001852  
<http://acmg.seas.harvard.edu/people/faculty/djj/book/>  
(For reference, a new hardback version is ~\$60 on Amazon)
- We will also make use of the following books. If you plan to pursue deeper study in atmospheric chemistry, I highly suggest purchasing one or both of these common, exhaustive references:
- Barbara J. Finlayson-Pitts and James N. Pitts  
*Chemistry of the Upper and Lower Atmosphere*  
Published: 2000, Elsevier Inc.  
ISBN: 978-0-12-257060-5
- John H. Seinfeld and Spyros N. Pandis  
*Atmospheric Chemistry and Physics*  
Published (3<sup>rd</sup> Ed): 2016, Wiley and Sons.  
ISBN: 978-1-118-94740-1

### **COURSE DESCRIPTION**

This is a course in atmospheric chemistry – an examination of the Earth’s atmosphere as a chemical system. It is assumed that you have a sound knowledge of general chemistry and basic organic chemistry. Having taken other, upper-division chemistry or physics courses may be beneficial as well; however, concepts not built directly on previous core courses will be introduced and explained as appropriate.

The course will be taught at the upper division level, and is also cross-listed as a graduate course. Some course material will be discussed explicitly through lectures. For other topics you will be expected to read and learn independently from assigned readings. In some cases you will have the opportunity to guide your own learning on specific topics, i.e. in preparation for a presentation or report.

### **Overview message from Dr. Huffman regarding COVID-19 / remote teaching:**

As you well know, so many things in our world are different than they were just weeks ago. A part of that newness is that all courses at the University of Denver (and most universities in the country) will teach remotely for the entire Spring quarter. This is a new experience for you and for all of us. I have included a tentative outline of lecture topics and tentative grading scheme. Normally I would hold very tightly to the schedule and all other details. Given the uncertainty in how we will all navigate this new educational medium, I am going to treat the schedule very loosely and I may change the schedule of topics or the number of assignments or exams given. It could be that we follow relatively closely, but it could also be that we will need to significantly alter any aspect of the plan. I will continue to communicate clearly via email, Canvas announcements, and by updating the schedule that I will keep posted on Canvas. We will all need to be flexible, however. I ask for your patience as we learn together how best to learn in this environment. I know you are likely under considerable additional stress during these strange weeks, and I will do my best to help support you as we go through this course. Please be quick to initiate discussion with me no matter what I can help with – course content, confusion about the technical interface, or any other concerns.

I endeavor to deliver content through a variety of means, both synchronous (live) and asynchronous (recorded). I will do this to create as much of the interactive feel of a normal class as possible, while balancing the unique challenges associated with remote/online learning. In some cases I will lecture live via Zoom. In other cases I may pre-record lectures.

Several presentations will be required for the course, and this will add a new layer of technical challenge. I will expect you to put some time into learning the “Zoom” software platform as you listen to lectures and prepare for your own presentations. The university is flush with resources to learn about these platforms, and I will also do my best to help. You will need to create a Zoom account. If you have not already done so, go to <https://udenver.zoom.us/> and download the Zoom client for your device. You can then log in using your DU email address and email (click SSO).

### **LECTURE**

The format of the class meetings will follow traditional lecture format on MWF. We will see how this goes and if it is better to pre-record lectures. As I begin, however, my anticipation is to deliver lectures live and then post the recorded versions of these on the Canvas site.

I will summarize new material and present illustrations and examples. For relevant sections of the course, you will be encouraged to practice problems after lectures. I will NOT be able to identify and describe every detail you read in the text and any supplemental materials. You will be expected to finish and understand assigned readings even if I have not gone over that material in great detail. However, I will emphasize important topics covered in the reading as well as problem solving strategies when appropriate. Please stop me at any time if you have questions.

### **OFFICE HOURS**

I will post hours when I will be available in my (Zoom) office for questions or issues related, or unrelated, to the course. These hours may be changed, if necessary, during the quarter, but this will be announced.

### **IMPORTANT DATES**

March 30: Classes begin, Spring Quarter

May 25: Memorial Day (No class)

June 5: Last day of classes

**June 08 (Monday): Final Exam, 10:00 – 11:50 AM**

## READING

Reading sections will periodically be assigned and mentioned in lecture or posted via Canvas. You are encouraged to complete the assigned reading prior to the class lecture and often again after the lecture. In addition, you are also encouraged to attempt the example exercises throughout the text while completing the assigned reading. I recommend that you understand the material and how to solve the sample problems before proceeding to the next section.

## GRADED ASSIGNMENTS

Periodic assignments will be required to be turned in for a grade. These may be homework assignments of problems taken from a book or may be more conceptual or literature-research driven in nature. Some assignments will be individual efforts and others will require group work. Homework problems will often be more difficult than exam questions in order to make you think.

For all assignments, it is very important that they are: (a) submitted as a single document per assignment in a standard document format, (b) typed or easily readable, (c) oriented in the correct way to be easily read (all pages). Assignments submitted without proper organization or clarity may be returned and may be counted as late and/or receive an additional grade penalty.

## EXAMS

Two (2) exams will be given during the quarter: one mid-term and one final exam. The dates of these exams will be given well in advance. **Under NO circumstances may the final be dropped or taken early.**

## GRADES

Your final grade will be earned according to your performance on a mix of assignments from both the lecture and laboratory portions of the course. The table below lists a tentative estimate of the final break-down that will be used. Any changes will be announced in class. The final letter grade will be assigned based on the table of percentages listed here. I will not grade on a curve, but overall grade averages may be slightly increased if necessary in some cases.

<b>Undergraduate Students</b>		
<b>Component</b>	<b>Points</b>	<b>Percentage</b>
Exams (2)	300	30%
Homework Assignments	250	25%
Review Assignment	100	10%
Journal Talks (2)	150	15%
Research Presentation	150	15%
Participation	50	5%
<i>Total</i>	1000	<i>100%</i>
<b>Graduate* Students</b>		
<b>Component</b>	<b>Points</b>	<b>Percentage</b>
Exams (2)	300	25%
Homework Assignments	250	21%
Review Assignment	100	8%
Journal Talks (3*)	200	17%
Research Presentation	150	13%
Research Report*	150	13%
Participation	50	4%
<i>Total</i>	1200	<i>100%</i>

<b>Letter Grade</b>	<b>Percentage</b>
A	93.0 - 100
A -	90.0 - 92.9
B +	87.0 - 89.9
B	83.0 - 86.9
B -	80.0 - 82.9
C +	75.0 - 79.9
C	69.0 - 74.9
C -	65.0 - 68.9
D +	62.0 - 64.9
D	58.0 - 61.9
D -	55.0 - 57.9
F	< 54.9

## **LECTURE AND TESTING ACCOMODATIONS**

I will make every effort to accommodate students diagnosed with a learning disability. I will do this in complete confidence. I request that any student requiring these accommodations inform me the first week of class. For further information, please see the University Disability Services' website:

<http://www.du.edu/disability/dsp/index.html>.

## **RELIGIOUS ACCOMODATION**

University policy grants students excused absences from class or other organized activities or observance of religious holy days, unless the accommodation would create an undue hardship. Faculty are asked to be responsive to requests when students contact them *in advance* to request such an excused absence. Students are responsible for completing assignments given during their absence, but should be given an opportunity to make up work missed because of religious observance.

Once a student has registered for a class, the student is expected to examine the course syllabus for potential conflicts with holy days and to notify the instructor by the end of the first week of classes of any conflicts that may require an absence (including any required additional preparation/travel time). The student is also expected to remind the faculty member in advance of the missed class, and to make arrangements in advance (with the faculty member) to make up any missed work or in-class material within a reasonable amount of time.

See: [http://www.du.edu/studentlife/religiouslife/DU\\_religious\\_accommodations\\_policy.html](http://www.du.edu/studentlife/religiouslife/DU_religious_accommodations_policy.html)

## **ACADEMIC DISHONESTY & STUDENT SUPPORT**

While I advocate collaborative learning and teamwork, I also firmly believe that each individual should maintain the highest ethical standards in all of life's endeavors. As such, I support and will strictly enforce the Honor Code of the University of Denver. See links for specific links below:

Pioneer Pledge: <http://www.du.edu/studentlife/ccs/pledge.html>

Honor Code Statement: [http://www.du.edu/studentlife/ccs/honor\\_code\\_2011-2012.pdf](http://www.du.edu/studentlife/ccs/honor_code_2011-2012.pdf)

I also understand that every student has unique personal and educational needs. I will do my best to help you learn or appropriately facilitate your ability to work through personal issues. Please see the Office of Student Life (<http://www.du.edu/studentlife/ccs/index.html>), including the Pioneer Care program (<http://www.du.edu/studentlife/care/>), for more detailed resources.

## **COURSE TOPICS**

Section I: Structure of the atmosphere and introduction

Section II: Stratospheric ozone chemistry

Section III: Tropospheric chemistry and air pollution

Section IV: Atmospheric aerosol and aerosol chemistry

Section V: Special topics – Airborne viruses and atmospheric chemistry

Section VI: Research presentations

Note that the list of topics is currently being kept modular and very flexible and is not necessarily listed in the order we will approach them. Because the course is not a specific pre-requisite for other courses, we have the luxury of being able to do things that fit the unique interests of the course. We will also be able to flex to fit the learning requirements necessitated by the remote nature of this course. Additional details will be provided through lecture slides.