Atmospheric Chemistry
CHEM 3410
Spring Quarter, 2021

Instructor: Dr. J. Alex Huffman
Zoom Office: https://udenver.zoom.us/my/alexhuffman
Contact Info: Email – 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: Boettcher Auditorium, Room 103

Under most circumstances, students will be expected to attend lectures in-person (i.e. a “normal” class). There may be situations that require a student or the instructor to miss for sanctioned reasons, in which case instruction by Zoom will be managed individually. This is not expected to be the standard case, however, and should be discussed with the instructor.

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
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 (3rd 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.
LECTURE
The format of the class meetings will follow traditional, live, in-person lecture format on MWF. Depending on the technology available, I may or may not record and post recordings of the lectures. If they are recorded, they will be made available 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 31: Classes begin, Spring Quarter
May 30: Memorial Day (No class)
June 8: Last day of classes
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. 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.

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<th>Component</th>
<th>Undergrad</th>
<th>Graduate</th>
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<tr>
<td>Exams</td>
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<tr>
<td>Homework Assignments</td>
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<tr>
<td>Presentations</td>
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<tr>
<td>Participation</td>
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<td>*Graduate project + pres.</td>
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<td>Total (Undergrad)</td>
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<td>Total (Grad)</td>
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<tr>
<td>A -</td>
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<td>B +</td>
<td>87.0 - 89.9</td>
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<td>B</td>
<td>83.0 - 86.9</td>
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<td>B -</td>
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<td>C -</td>
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<td>D -</td>
<td>55.0 - 57.9</td>
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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

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

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.