



Department of

Environmental & Civil Engineering

Mercer University

EVE 403

Atmospheric Chemistry

Spring Semester 2020

M, W, F

11:00 – 11:50

Room EGC 109

Instructor: André Butler, Associate Professor of Environmental and Civil Engineering
Office: Suite 116E, School of Engineering (very flexible office hours by appointment)
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Email: butler_aj@mercer.edu

Supplemental Texts: Hobbs, Peter V. *Introduction to Atmospheric Chemistry*, Cambridge, 2000.
ISBN-13: 978-0521771436 (\$46-60, Amazon)

Finlayson-Pitts, B.J. and Pitts, J.N. *Chemistry of the Upper and Lower Atmosphere*, Academic Press, 2000. ISBN-13: 978-0122570605 (\$42-131, Amazon)

Catalog Description:

An introduction to atmospheric chemical transformations; atomic structure and chemical bonding; thermodynamics, gas-phase kinetics, and photochemistry; tropospheric and stratospheric processes.

Course Objectives:

Upon successful completion of this course, students will be able to

1. Predict how/when elements will bond.
2. Use thermodynamic and/or kinetic information to determine the feasibility of atmospheric reactions.
3. Write chemical rate expressions and provide detailed analyses of reaction mechanisms.
4. Explain the major processes involved in stratospheric ozone depletion.
5. Explain the major processes involved in tropospheric ozone proliferation.
6. Catalog the major sources of atmospheric pollutants.
7. Explain major sink processes for atmospheric trace gases and aerosol species.
8. Describe horizontal and vertical transport of atmospheric pollutants.
9. Discuss and critique atmospheric chemistry research papers.

Outcomes will be measured and assessed by grades earned for homework, exams, research paper critiques and discussion. In addition, primary instructor evaluation and student feedback on the perceived quality of the course will be used to make future improvements.

Course Website: http://faculty.mercer.edu/butler_aj/eve403.htm (Visit often for course updates)

Prerequisites (and/or co-requisites):

EVE 402, Air Pollution Generation and Control

Course Content:

1. Introduction/review (~3-4 weeks)
 - a. Atomic structure
 - b. Chemical bonding
 - c. Nomenclature
 - d. Chemical reactions (thermochemistry)

2. Gas-phase kinetics and photochemistry (~2-3 weeks)
3. Stratospheric chemistry (~2-3 weeks)
4. Tropospheric chemistry (~3-4 weeks)

Grading: The final grade will be determined as follows:

Homework/Critiques	10%	
Exam#1	30%	
Exam#2	30%	
Final Exam	30%	Thursday, 4/30/2020 (9:00 – 12 noon)

Homework: Homework is an important component of the class and will be distributed regularly. Collaboration is acceptable, but each student must submit an individual assignment. Late homework assignments will not be graded.

Critiques: Research articles focusing on various aspects of atmospheric chemistry will be distributed up to four times throughout the term. Each student will be required to submit a 600-word critique of the article, adhering to a specific format that will be discussed.

Class Participation: Students are expected to attend class and actively participate during discussions.

Class Standards

1. Please turn off cell phones before entering the classroom.
2. Firearms/weapons are not allowed in Mercer University campus facilities. For more information, visit the MERPO website (<https://police.mercer.edu/>).
3. The **honor code** provisions as outlined in the *Bulletin* and in the student handbook, *The Lair*, will be assumed for everyone. It should be clear from class discussion whether an assignment is collaborative or individual. When in doubt, please ask to avoid potentially embarrassing situations. Plagiarism is a violation of the honor code and is strictly prohibited.
4. Students in need of accommodation due to a disability should contact the Access and Accommodation Office to complete the verification process to become approved for services. In order to receive accommodations, each term, students will request accommodation and faculty notification forms through the Access Office online system *Accommodate*. Students are strongly encouraged to schedule a meeting with each professor in a timely manner to discuss arrangements. Accommodations are not retroactive in nature. Note - Disability accommodations or status are not reflected on academic transcripts. Students with a history of a disability, perceived as having a disability or with a current disability who do not wish to use academic accommodations are also strongly encouraged to complete the verification process with the Access Office. Students must request accommodations in a timely manner to receive accommodations in a timely manner.
5. **Mental Health and Wellness:** Mercer University faculty and staff recognize that mental health concerns can impact academic performance and interfere with daily life activities. Please notify your faculty member or academic advisor for academic assistance, as needed. CAPS can also provide support if you're feeling stressed, overwhelmed, anxious, depressed, lost or are struggling with personal issues. Please call or visit the [Counseling and Psychological Services \(CAPS\) website](#) for more information. These services are free and confidential, and support non-traditional, graduate, and undergraduate students. Students at Regional Academic Center locations may call a CAPS Office for assistance in finding local services (that may charge for their services) if distance to either campus creates challenges. CAPS locations include: MACON – Linden House (attached to the MEP Residence Hall), 478-301-2862; ATLANTA – 215 Sheffield Student Center, 678-547-6060.
6. This syllabus is subject to change.

Electronic Communication

As the need arises, I may choose to communicate to the class via email. I will do this using a database that incorporates your official Mercer email account. As a general rule, I will not accommodate your personal email accounts regarding emails to the class.