EVE 403
Atmospheric Chemistry
Spring Semester 2006
Monday and Friday
1:00 – 2:15
Room EGC 110

Instructor: André Butler, Assistant Professor
Environmental and Mechanical Engineering

Office: Suite 101G, School of Engineering

Availability: By appointment; VERY flexible

Phone: 301-2476 (w)

Email: butler_aj@mercer.edu

Supplemental Texts:

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 corequisites)
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  20%
Exam#1  25%
Exam#2  25%
Final Exam  30%  Friday, 5/5/2006 (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 approximately four times throughout the term. One pre-selected student (randomly chosen) will lead the class in a discussion/critique of the article’s content, methods, results, conclusions, etc., and all students must be prepared to contribute to the discussion. In addition, each student (including the discussion leader) will be required to submit a 600-word critique of the article.

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

Class Standards
1. Please turn off cell phones and pagers before entering the classroom.
2. The honor code provisions as outlined in the Bulletin and in the student handbook, The Lair, will be assumed for everyone. Plagiarism is a violation of the honor code and is prohibited.
3. This syllabus is subject to change.
Important Additional Information:

Students with a documented disability should inform the instructor at the close of the first class meeting. The instructor will refer you to the office of Student Support Services (SSS) for consultation regarding evaluation, documentation of your disability, and recommendations for accommodation, if needed. Students will receive from SSS the *Faculty Accommodation Form*. On this form SSS will identify reasonable accommodations for this class. The form must be given to the course instructor for signature and then returned to SSS.

To take full advantage of disability services, it is recommended that students contact the Office of Student Support Services, immediately. The office is located on the third floor of the Connell Student Center.