

Instructor: Dr. John B. Miller
3156 Wood (Office)
4414/4450 Haenicke (lab)
387-2871
john.b.miller@wmich.edu

Office Hours: T,R 1400-1500
or by appointment

Class: Lecture 1200–1250 MWF M^cCracken 4420

Prerequisites: CHEM 431 or equivalent, or by permission of the instructor.

Organization:

This course is structured as a seminar course. Each week we shall read an average of 2-5 papers from the primary literature and discuss and dissect them in class. Additional readings will be assigned or suggested from textbooks and other sources as required or requested. The class discussion will be focused around four major questions.

1. What is the interface?
2. What are the processes?
3. What is the science?
4. What are the environmental implications?

Members of the class will be called upon to lead the group discussion. It is suggested that each student prepare notes or talking points addressing each question for each paper. **All** students will be expected to take part in the class discussion. *It is particularly important that each member of the class understand and be able to briefly explain the physical chemistry underlying the results presented in each paper.*

Course Topics:

A variety of interfaces and applications will be examined, using the following basic outline:

1. Abiotic systems
 - a) Gas-solid

This is by far the best understood interface in the environment. Furthermore, many of the fundamental principles of surface chemistry are founded on a gas-solid model, so a great deal of attention will be focused on this topic. We shall discuss aerosols, droplets, crystals and amorphous systems

 - i) Non-reactive
 - ii) Reactive
 - iii) Photoreactive
 - b) Gas-liquid interactions and solid-liquid
 - c) liquid-liquid, gas-gas and solid-solid
2. Biological systems
 - a) Passive
 - b) Active
 - i) Respiration
 - ii) Biofilms
3. Technology
 - a) Pollution Remediation
 - i) Scrubbing
 - ii) Catalysis
 - b) Prevention
 - i) Catalysis
 - ii) Fuel Cells

Readings:

Reading will be assigned regularly. Textbooks will be placed on reserve as necessary. Preparatory notes will not be collected. However, performance in the class is *highly* correlated with completion of the reading. Group study may be very useful.

Term Paper:

A term paper (15-20 pages) brief (15-20 minute) related to environmental surfaces or surface processes will be required. The topic will be selected in consultation with Dr. Miller by Friday 19 October. A referenced outline is due by 16 November.

<u>Grading:</u>	Class Participation	70%
	Paper Outline	10%
	Term Paper	20%

Policies:

Attendance in class is important for success in this course. Students should contact Dr. Miller if they know they are going to miss a class.

You are responsible for making yourself aware of and understanding the policies and procedures in the Graduate Catalog (pp. 24-26) that pertain to Academic Integrity. These policies include cheating, fabrication, falsification and forgery, multiple submission, *plagiarism*, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Judicial Affairs. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.