Environmental Studies 141: Chemistry of Global Change  
Winter 2017  
Instructor: Prof. Jordan F. Clark

OFFICE: Webb 2115  
OFFICE HOURS: Mondays 8:30 to 9:30, and by appointment  
EMAIL: jfclark@geol.ucsb.edu  
CLASS LOCATION: Phelps 2536  
CLASS HOURS: Tu/W 9:30-10:45  
PREREQUISITE: Chemistry 1ABC

Course Objectives
- Differentiate between environmental chemistry and laboratory chemistry
- Apply fundamental chemical principles in the context of environmental problems
- Understand the roles of carbon dioxide and the oceans in global climate change

Expectations
You are expected to: (1) attend class regularly, (2) be an active participant in class, (3) turn in assignments on time, and (4) do the required reading.

Assignments
Homework assignments will be handed out in class and will usually be due at the start of the next class. Late homework will not be accepted since we will discuss the answers in class.

Reading
1) The Role of the Ocean in Climate: Yesterday, today, and Tomorrow by Wallace Broecker (GauchoSpace)  
2) Introduction to Environmental Chemistry by Andrews et al. (GauchoSpace)  
3) Elements of Environmental Chemistry by Ronald Hites (GauchoSpace)  
4) Climate Change by Edmond A. Mathez (GauchoSpace)  
5) Other readings will be posted on GauchoSpace

Exams
The course exam is scheduled for March 9 during the regular class time

Evaluation
Your course grade will be based on:  
- Class Participation and Quizzes (20%)  
- Problem Sets (30%)  
- Class Final (20%)  
- Term Paper (30%)  
I might scale the grades at the end of the course. No extra credit will be offered.
Course Schedule (subject to change):

Week 1 (1/10 & 1/12): Introduction, Review of Chemical Equilibrium & Kinetics
   *An Introduction to Environmental Chemistry* by Andrews et al., Chap. 1 & 2,
   Box 3.2, 3.4, & 4.4
   *Elements of Environmental Chemistry* by Hites, Chap. 1

Week 2 (1/17 & 1/19): Principles of System Modeling
   *Elements of Environmental Chemistry* by Hites, Chap. 2 & 3.4

Week 3 (1/24 & 1/26): Introduction to the Oceans & Radiative Forcing
   Broecker, Chap. 1
   *An Introduction to Environmental Chemistry* by Andrews et al., Selections
   form Chap. 6
   Mathez, Chap. 3 & 5
   **1/24: Problem set #1 due in class**

Week 4 (1/31 & 2/2) The Global Carbon Cycle & Carbonate Chemistry
   Broecker, Chap. 4
   Hites, Chap. 4 (omit 4.2)
   Mathez, Chap. 4
   **2/2: Abstract & References due before class**

Week 5 (2/7 & 2/9) Carbonate Chemistry continued & Ocean Acidification
   Broecker, Chap. 6
   Mathez, Chap. 4, continue
   **2/27: Problem set #2 due in class**

Week 6 (2/14 & 2/16) Introduction to Long-Term Climate Change
   Broecker, Chap. 2 & 5
   **2/16: First Draft of Paper due by 5 pm**

Week 7 (2/21 & 2/23) Long-Term Climate Change continued
   Broecker, Chap. 2 & 5, continued
   **2/21: Problem set #3 due in class**

Week 8 (2/28 & 3/2) Warming and some Consequences
   Mathez, Chap. 7
   **3/2: Peer Reviews are due by 5 pm**

Week 9 (3/7 & 3/9) Review and Final Class Exam
   **3/9 Final Class Exam**

   Mathez, Chap. 10
   **3/16: Problem set #4 due in class**

   **3/22 (Day of Scheduled Final): Final Draft of papers are due by 5:00 pm**
Policies

- All incidents of academic misconduct will be reported to the Dean of Students Office and will result in a grade of “F” in the course.

- “The grade Incomplete (I) may be assigned when a student's work is of passing quality but is incomplete.”

- It is against UCSB policy to give grade information by email. Please check GOLD for your course grade and/or come to my office to see your final exam.

- **Turn off cell phones and laptops before class. Do not use either during class.**