Global Geochemical Cycles and Change CMSS 6357  
Department of Physical and Environmental Sciences  
Spring 2017

A. COURSE INFORMATION

Course number/section: CMSS 6357/001  
Class meeting time: TR 9:30-10:45 pm  
Class location: O’Conner 255  
Course Website: http://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Xinping Hu  
Office location: Science Lab #2 Room 104  
Office hours: TR 11:00 am -12:00 pm, F 9:00 am -12:00 pm  
Telephone: 825-3395  
e-mail: Xinping.Hu@tamucc.edu  
Appointments: By request

C. COURSE DESCRIPTION

Catalog Course Description
Integrated examination of global-scale geochemical cycles operating within and between the four components of the Earth system (atmosphere, hydrosphere, biosphere, and solid Earth) and their role in the evolution of our planet.

Extended Course Description
Simple modeling exercises based on Stella® will be used to examine coupling of these components and effects of perturbation caused by both natural and anthropogenic forces. Students are expected to participate in the teaching process through their involvement in small groups, class discussions, and modeling/simulation exercises.

D. PREREQUISITES AND COREQUISITES

Prerequisites
CHEM 1311/1312 General Chemistry I and II and CHEM 3411 Organic Chemistry I, or permission of instructor.

Corequisites
None.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
None

Optional Textbook(s) or Other References
Several reference books are recommended, including


Additional literature reading and discussion is required throughout the semester.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

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

1. Demonstrate understanding of the biogeochemical cycles of key elements and the processes governing the movement of these elements between the lithosphere, hydrosphere, atmosphere, and biosphere on different temporal and spatial scales.
2. Demonstrate ability to examine perturbations to biogeochemical cycles using modeling technique.
3. Demonstrate the ability to critique, appraise, and assess the scientific literature relevant to biogeochemical cycles.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

The course is given by face-to-face lectures augmented with PowerPoint slides. Frequent in-class discussions on selected topics that are based on recent literature from both the instructor and the students will be conducted.

H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Discussion</td>
<td>40</td>
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<tr>
<td>Final Exam</td>
<td>30</td>
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<tr>
<td>Term paper</td>
<td>30</td>
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<td>Total</td>
<td>100</td>
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I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
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<tbody>
<tr>
<td>Week 1 Jan 15</td>
<td>Introduction to Biogeochemistry</td>
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<tr>
<td>Week 2 Jan 22</td>
<td>Origin of Elements</td>
<td></td>
<td>1/25, Last day to register class</td>
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<tr>
<td>Week 3 Jan 29</td>
<td>Origin of Earth, early Atmosphere, Part 1</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Topic</td>
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<tr>
<td>4</td>
<td>Feb 5</td>
<td>Origin of Life and the rise of Oxygen in the Atmosphere, Part II</td>
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<tr>
<td>5</td>
<td>Feb 12</td>
<td>Biogeochemical Cycles - Definitions, The Global Oxygen Cycle</td>
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<td>6</td>
<td>Feb 19</td>
<td>The Atmosphere - Reservoir and Transport Medium, The Global Water Cycle</td>
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<td>7</td>
<td>Feb 26</td>
<td>Terrestrial ecosystems, Processes and Reactions, Part I</td>
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<tr>
<td>8</td>
<td>Mar 5</td>
<td>Terrestrial ecosystems, Processes and Reactions, Part II</td>
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<td>9</td>
<td>Mar 12</td>
<td>Spring break – no class</td>
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<tr>
<td>10</td>
<td>Mar 19</td>
<td>Soil processes - Basics</td>
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<tr>
<td>11</td>
<td>Mar 26</td>
<td>Soil processes - Nutrient Cycling, Nitrification vs. Denitrification</td>
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<td>12</td>
<td>Apr 2</td>
<td>The Global Nitrogen Cycle and N$_2$O</td>
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<td>13</td>
<td>Apr 9</td>
<td>Human Perturbation to Nitrogen cycle</td>
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<td>14</td>
<td>Apr 16</td>
<td>The Global Sulfur Cycle</td>
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<tr>
<td>15</td>
<td>Apr 23</td>
<td>The Global Carbon Cycle, Basics</td>
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<td>16</td>
<td>Apr 30</td>
<td>The Global Carbon Cycle, Details</td>
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<td>Final Exam – (May 4, 8:00-10:30 am)</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
The student is expected to be on time and attend every class. If absent, it is the responsibility of the student to obtain missed information from a classmate. Missed information includes not only lecture notes, but also any possible information regarding syllabus changes. The student is expected to arrive on time prepared to take notes and work on in-class problems with pen or pencil, paper, calculator and colored markers/pencils.

Late Work and Make-up Exams
There will be no make-up exams for this class. If you miss one lecture exam, your final exam grade will be counted twice to replace the missed exam. If you miss more than one exam, you will receive a zero for the second missed exam. Certain university-related circumstances may warrant a makeup exam with prior notification, documentation, and arrangements. Do not show up late to an exam; no student will be admitted to the exam after the first exam-taker has left.

Extra Credit
Up to 10 points will be added to each exam (100 points)

Cell Phone Use
Before you enter the lecture hall turn OFF your cell phone! Beepers must also be turned off or put on silent mode. Electronic interruptions will NOT be tolerated.

**Laptop Use**
Laptops are to be used only for lecture material. Use of laptops for non class items will not be permitted.

**Food in Class**
Generally, food in class is not permitted during class. It is permissible to bring appropriate snacks during the 2 1/2 hour final exam. Coffee, sodas, energy drinks are permissible.

**Missed Exam**
See Late Work and Make-Up Exams above.

**Participation**
Students are expected to attend all classes and be prepared to ask and/or answer questions. Pop quizzes are given to assess mastery of material and as an indication of attending class.

**Student Responsibility**
It is the student’s responsibility to read and be aware of the contents of this syllabus and the course website on Blackboard. Announcements and changes are communicated in the classroom, Blackboard, and/or emails.

**K. COLLEGE AND UNIVERSITY POLICIES**

- **Academic Integrity (University)**
  It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage their own affairs. Students are viewed as individuals who possess the qualities of worth, dignity, and the capacity for self-direction in personal behavior.
  See Full University Policy at [http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity](http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity)

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state, and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that must be submitted. No student is eligible to receive a W without completing the official drop process by the
• **Grade Appeals (College of Science and Engineering)**

As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

• **Disability Services**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services Office for assistance at (361) 825-5816. My office is a Veterans Green Zone office. If you need to talk, come and see me.

[http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

L. **OTHER INFORMATION**

• **Academic Advising**

The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.