ORGANIC AND ISOTOPE GEOCHEMISTRY (CMSS 6361)
Department of Physical & Environmental Sciences
Fall 2015

A. COURSE INFORMATION
   Course number/section: CMSS 6361 - 002
   Class meeting time: TR 14:00-15:15 PM
   Class location: TBA
   Course Website: https://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION
   Instructor: Dr. Hussain Abdulla
   Office location: CS-242
   Office hours: M 11am-13:00 PM & R 9:00-11:00 AM
   Telephone: 361-825-6050
   e-mail: hussain.abdulla@tamucc.edu
   Appointments: Appointment should be arranged ahead of time via e-mail.

C. COURSE DESCRIPTION
   Catalog Course Description
   Organic compounds of biologic and industrial origin are used to study past sedimentary environments. Applications of oxygen, carbon, hydrogen and nitrogen stable isotope systems are employed to complement information gained from various organic geochemical studies.

   Extended Course Description
   The course is designed around the global geochemical cycles of organic matter (mostly C, N and P) in marine and sediments from structural and isotopic aspects. It will discuss the major processes that affect the different organic matter reservoirs, fluxes between different organic matter reservoirs, models of organic matter degradation and preservation; role of anoxia in organic matter burial, relationships between dissolved and particulate organic matter; molecular level characterization of organic matter, and application of biological markers as tools in oceanography.

D. PREREQUISITES AND COREQUISITES
   Prerequisites
   CHEM 3411 Organic Chemistry I and GEOL 1403 Physical Geology or permission from the instructor.

   Co-requisites
   None.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
Required Textbook(s)
Assigned readings of journal articles and book chapters.

Optional Textbook(s) or Other References
1) Principles of Stable Isotope Geochemistry. By Zachary Sharp. Publisher: Prentice Hall.

All other materials related to each topic will be posted on Blackboard or provided in class.

Supplies
None.

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.

By the end of this course, students should be able to:

1. Define isotope fractionations and calculate the isotopic fractionations of different systems.
2. Define geochemical biomarkers and how to use them as indicators of biogenic, and geochemical processes.
3. Utilizing the stable isotopes and biomarkers to inform us about Earth’s past climate and biota.
4. Recognize the processes that control the biosynthesis, transport, transformation, preservation and degradation of organic matter in nature.
5. Identify the characterization methods used to classify natural organic compounds in complex mixtures.
6. Use the stable isotopes and biomarkers to quantify the fluxes between different organic matter reservoirs.
G. INSTRUCTIONAL METHODS AND ACTIVITIES

Coursework involves the analysis of research articles, several problem sets, class participation, and a student research proposal.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Problem Sets:
A number of problem sets related major topic of the course including: isotope fractionations, geochemical biomarkers, chemical characterization of organic matter, fluxes between different organic matter reservoirs, models of organic matter degradation and preservation; role of anoxia in organic matter burial, relationships between dissolved and particulate organic matter.

Student Research Proposal:
Each student is responsible for submitting and presenting a 15 page long NSF style research proposal (see http://www.nsf.gov/publications/pub_summ.jsp?ods_key=GPG for more proposal guideline). Choice of topic must relate directly to organic geochemistry. If you have a question regarding your choice consult with your instructor. The Title and 1 paragraph summary will be required approximately half-way through the semester. This project will comprise half of the student's final grade for the course.

Presentation:
A 25-minute PowerPoint presentation will be required of all students, on their proposal by the end of the semester.

Grading
There are no exams for this course. Grades will be determined on the basis of the total number of points earned on class participation, problem sets, student research proposal and the presentation.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Number</th>
<th>Pts/Assignment</th>
<th>Total possible points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Set</td>
<td>12</td>
<td>4</td>
<td>48</td>
</tr>
<tr>
<td>Research Proposal</td>
<td>1</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Presentation</td>
<td>1</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>100</td>
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The grading scale will be: A ≥ 90% of possible points, B ≥ 80 %, C ≥ 70 %, D ≥ 60 %, F < 60%.

I. COURSE CONTENT/SCHEDULE
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Assignment</th>
<th>What's Due</th>
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<tbody>
<tr>
<td>Aug 24&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Introduction to Stable Isotope</td>
<td></td>
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<tr>
<td>Aug 30&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Equilibrium Isotope</td>
<td>Isotope fractionation</td>
<td></td>
</tr>
<tr>
<td>Sept. 6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Hydrosphere Isotopes</td>
<td>Hydrosphere isotopes</td>
<td>Isotope fractionation</td>
</tr>
<tr>
<td>Sept. 13&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Carbon Isotopes</td>
<td>Carbon Isotopes</td>
<td>Hydrosphere isotopes</td>
</tr>
<tr>
<td>Sept. 20&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Nitrogen Isotopes</td>
<td>Nitrogen Isotopes</td>
<td>Carbon Isotopes</td>
</tr>
<tr>
<td>Sept. 27&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Organic Geochemistry Methods</td>
<td>Organic Methods</td>
<td>Nitrogen Isotopes</td>
</tr>
<tr>
<td>Oct. 4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Organic matter Composition</td>
<td>Organic matter Composition</td>
<td>Organic Methods</td>
</tr>
<tr>
<td>Oct 11&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Organic matter Cycling</td>
<td>Organic matter Cycling</td>
<td>Organic matter Composition</td>
</tr>
<tr>
<td>Oct. 18&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Biomarkers</td>
<td>Biomarkers</td>
<td>Organic matter Cycling</td>
</tr>
<tr>
<td>Oct. 25&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Sediment Geochemistry</td>
<td>Sediment Geochemistry</td>
<td>Biomarkers</td>
</tr>
<tr>
<td>Nov. 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Carbon Preservation</td>
<td>Carbon Preservation</td>
<td>Sediment Geochemistry</td>
</tr>
<tr>
<td>Nov. 8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Anoxic Sediments</td>
<td>Anoxic Sediments</td>
<td>Carbon Preservation</td>
</tr>
<tr>
<td>Nov. 15&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Petroleum Formation</td>
<td>Petroleum Formation</td>
<td>Final proposal due/ Anoxic</td>
</tr>
<tr>
<td>Nov. 22&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Class Presentations</td>
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<td>Petroleum Formation</td>
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<tr>
<td>Nov. 29&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Class Presentations</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 shown are directly related to the Student Learning Outcomes described in Section F.

J. **COURSE POLICIES**

**Attendance/Tardiness**
Attendance and participation in class discussions is required and will count for a significant portion of your grade.

**Late Work and Make-up Exams**
There will be a 10% reduction, per day, in credit for overdue assignments.

**Extra Credit**
There will be no extra credit in this course.

**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 and tablets are allowed in the classroom for course related activities only.

**Food in Class**
No food is allowed in the classroom, unless related to academic activities, medically necessary, or nutritionally sound with teacher permission. But beverages in spill proof containers are permitted.
Missed Exam
There are no exams for this course.

Participation
Participation in class discussions is required and will count for a significant portion of your grade.

K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

• Classroom/Professional Behavior
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

• Statement of Civility
  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 this deadline. Please consult the Academic Calendar
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, and the College of Science and Engineering Grade Appeals webpage at 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.

http://disabilityservices.tamucc.edu/

Statement of Academic Continuity
In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

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.