INSTRUCTOR
Dr. Valeriu Murgulet
Office: CS 205
Email: valeriu.murgulet@tamucc.edu

LECTURES: MWF 11:00 – 11:50 AM; BH-201

OFFICE HOURS: TBA

COURSE DESCRIPTION
Introductory study of the Earth processes using principles of chemical equilibrium, thermodynamics, isotope geochemistry and organic geochemistry. Applications of low-temperature geochemistry to geologic problems. Prerequisites: CHEM 1311 and CHEM 1111, CHEM 1312/1112, MATH 2413, GEOL 3414 and/or with instructor’s permission.

COURSE OBJECTIVES
This course will give students the skills to:
1. Understand the fundamentals and applications of geochemistry and its relevance in the Earth processes.
2. Discuss the most important concepts of inorganic, organic and isotope geochemistry.
3. Discuss current issues in the field of geochemistry.
4. Apply geochemical models and equations to solve geochemical problems.

RECOMMENDED TEXTBOOKS

COURSE GRADING
Two Midterm Exams: 15% each
Final Exam 20%
8 Problem Sets 40%
Presentation 10%

GRADING POLICY
A: 90-100%; B: 80-89.9%; C: 70-79.9%; D: 60-69.9%; F: 0-59.9%
ATTENDANCE POLICY
All students are expected to attend class. Poor attendance will result in missed lecture material and may reflect in less than desired class performance. It is the students’ responsibility to acquire class notes from peers if class is missed.

EXAMS
Each student is expected to take all exams at the designated time and place. Students who miss an exam will receive a grade of zero for that exam. Make-up exams will be given only on presentation of approved medical excuse, or by pre-excused permission of the instructor. No exceptions! One and only one make-up exam will be given after each regularly scheduled exam. Time and place for the make-up exam will be arranged at the next regularly scheduled class following each exam. The format of make-up exams may differ from that of the regular exam. All exams are closed book; however, the use of a calculator is permitted. Students who want to appeal a grade should do it in writing, at latest one day after the exam was returned. Please note the date of the final exam. No final exam will be given at an earlier date. Disability accommodations must be documented and approved by the Office of Disability Services.

GRADE APPEALS
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 on 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 on the process, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, consult Texas A&M University-Corpus Christi University Procedure 13.02.99.C2.01 Student Grade Appeal Procedures (http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage (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 or the College of Science and Engineering Dean’s Office.

PROBLEM SETS
Eight problem sets will be assigned throughout the semester and are due a week later. You must do your own work. Late problem sets will receive half credit and will not be graded if turned in after graded problem sets have been handed out.

PRESENTATION
Each student will select a topic from an approved list, research the topic, give a 15 minute presentation and write a one page (typed) abstract. The subject of the presentation will be chosen in consultation with the instructor.

NOTICE TO STUDENTS WITH DISABILITIES AND VETERANS
Texas A&M University-Corpus Christi complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. If you
suspect that you may have a disability (physical impairment, learning disability, psychiatric disability, etc.), please contact the Services for Students with Disabilities Office, located in Driftwood 101, at 825-5816. If you need disability accommodations in this class, please see me as soon as possible.

**ACADEMIC ADVISING**
The College of Science and 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. The College's Academic Advising Center is located in the Center for Instruction, room 350, and can be reached at 825-6094.

**ACADEMIC INTEGRITY**
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. Please be advised that the penalty for cheating is a failing grade and possible further disciplinary action by the university.

The university policy of scholastic dishonesty will be followed in the event of academic misconduct. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student.

**TENTATIVE CLASS SCHEDULE**

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<thead>
<tr>
<th>Date</th>
<th>Lecture</th>
<th>Assignment</th>
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<tbody>
<tr>
<td>January</td>
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<tr>
<td>22</td>
<td>Introduction. Fields of Geochemistry.</td>
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<tr>
<td>24</td>
<td>Origin of the Elements. Distribution and Associations of the Elements.</td>
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<td>29</td>
<td><strong>Equilibrium Thermodynamics and Kinetics.</strong> The Laws of Thermodynamics.</td>
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<td>Equilibrium Thermodynamics.</td>
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<td>31</td>
<td>Calculation of Activity Coefficients.</td>
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<td>February</td>
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<td>3</td>
<td>LABOR DAY HOLIDAY</td>
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<tr>
<td>5</td>
<td>Aqueous Complexes. Kinetics.</td>
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<td>7</td>
<td><strong>Acid-Base Equilibria.</strong> Acids and Bases. pH of Natural Waters.</td>
<td><strong>P.S. #1 DUE</strong></td>
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<td>10</td>
<td>Carbonic Acid. Carbonate System.</td>
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Acidity and Alkalinity.
**Oxidation-Reduction Reactions.** Basic Principles.
Oxidation-Reduction Diagrams.
The Role of Microorganisms in Oxidation-Reduction Reactions.
Oxidation-Reduction Processes in Natural Systems.
**Mineral Chemistry**. Basic Mineralogy.

**March**
3 Ion-Exchange Properties. Crystalline and Amorphous Silica.
5 **EXAM #1**

10 – 14 **SPRING BREAK**
17 U-series Disequilibrium Methods of Dating.
19 **Stable Isotopes.** Principles. Oxygen and Hydrogen Isotopes.
24 **Carbon Chemistry.** Structure and Naming of Organic Compounds.
26 Humic Substances. Soil and Marine Organic Matter.
28 Coal. Petroleum.
31 Natural Carbon Inputs to Surface and Ground Waters.

**April**
2 **Atmospheric Chemistry.** Early Earth Atmosphere and Ocean. Present Composition of the Atmosphere.
4 The Carbon Cycle and Atmospheric CO₂.
7 Ice and Sediment Core Geochemistry.
9 Rainwater Chemistry.
11 Chemistry and Sources of Atmospheric Particulates (Aerosols).
14 **Chemistry of Natural Waters.** Hydrologic Cycle. Weathering.
16 Geochemistry of Surface and Ground Waters.
18 Geochemistry of Surface and Ground Waters (cont.)
21 Adsorption-Desorption Processes.
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<tr>
<th>Date</th>
<th>Topic</th>
<th>Due</th>
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<tbody>
<tr>
<td>23</td>
<td>Metals</td>
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<td>25</td>
<td>Nonmetals</td>
<td>P.S. #7 DUE</td>
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<td>28</td>
<td>EXAM #2</td>
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<td>30</td>
<td>Marine Chemistry. Chemical Composition of the Open Ocean.</td>
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<td>May 2</td>
<td>Seawater Chemistry.</td>
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<td>5</td>
<td>Geochemistry of Marine Sediments.</td>
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<td>Final Exam Study Sheet</td>
<td>P.S. #8 DUE</td>
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**FINAL EXAMINATION TBA (2.5 hour exam)**

**READING:** Reading material will be assigned at the end of each lecture session.

**NOTE:** The syllabus is subject to change at the instructor’s discretion.