Advanced Inorganic Chemistry – CRN: 71611  
Department of Physical and Environmental Sciences  
Spring 2016

A. COURSE INFORMATION

Course number/section: 4407.001  
Class meeting time: TR – 17:00-18:45  
Class location: CI-109  
Course Website: Most announcements, forms, handouts, lecture notes, learning materials etc. are either posted, or will be posted on blackboard. You will be able to login using your student ID and Password.

B. INSTRUCTOR INFORMATION

Instructor: Dr. Cesar A. Marquez  
Office location: CS-206  
Office hours: MTW – 14:00-16:00  
Telephone: (361) 825 5701  
e-mail: cesar.marquez@tamucc.edu  
Appointments: By email

C. COURSE DESCRIPTION

The course aims to provide the student with a firm understanding of in the synthesis, properties and behavior of inorganic and organometallic compounds. The course offers a balanced coverage of core principles and theory, together with an introduction to advanced topics related to actual trends in Bioinorganic Chemistry, Catalysis, and Life Sciences.

D. PREREQUISITES AND COREQUISITES

Prerequisites
This class will cover a number of organic and biochemical structures, functions and mechanisms. Two semesters of Organic Chemistry and one semester of Biochemistry are recommended.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook

Suggested texts
Bioinorganic Chemistry; Rehder, D.; Oxford University Press, 2014  
Bioinorganic Chemistry. A Practical Course; Metzler, N.; de Gruyter, 2009
Environmental Photochemistry - The Handbook of Environmental Chemistry / Reactions and Processes; Volume 2, CH 6.5, 2013
Treatise on Geochemistry; Holland H. D.; Elservier, Volume 6, 2003

**Course Tutoring**
You can find information regarding the Tutoring at: [http://casa.tamucc.edu](http://casa.tamucc.edu)

**F. STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to improve learning. The process begins by describing student’s learning outcomes (they focus on what you are expected to learn) like the ones described below for this course. By measuring how well you are accomplishing these student’s learning outcomes the instructor can take appropriate actions to enhance your learning.

From organometallic chemistry which bridges the gap between organic and inorganic chemistry to nanotechnology, enzyme mimicking or the marine bioinorganic chemistry, inorganic chemistry continues to be a large, important, and rapidly growing field in which all students of chemistry should be knowledgeable.

The course will provide the students with the necessary skills to understand the periodic properties of the elements, the theoretical basis of structure and bonding of inorganic compounds, as well as their physical and chemical properties. Students will also learn group theory and its applications in molecular orbital theory and spectroscopic interpretation, solid-state chemistry and main group chemistry. Finally, the course aim to offer the students the fundamental knowledge require to confront actual applications in coordination chemistry, organometallic and bioinorganic compounds, as well as current scientific challenges.

In summary, upon successful completion of this course, students will be able to recognize the relevance of inorganic chemistry in a variety of disciplines such as biochemistry, environmental chemistry, marine sciences, medicine or nanotechnology.

**G. MAJOR COURSE REQUIREMENTS AND GRADING**

The course will be graded using two semester’s exams, a topic review and a research proposal. They will be graded separately (100 pts each), and the final course grade will consider 400 pts, 75% total mark of the final course grade. The laboratory part will count as the remaining 25%.

Final letter grading for the course will be as follows:

A > 90%, B > 80%, C > 70%, D > 60%, F < 60%

The course included weekend challenges (exercises) embracing the material that has been covered in class by that time. The challenges have the goal of helping the student evaluate her/his progression during the course. These exercises are voluntary and self-corrected, and will be not graded.
H. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>Week – Day</th>
<th>Topic</th>
<th>Reference</th>
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</thead>
<tbody>
<tr>
<td>01/21</td>
<td>Introduction to Inorganic Chemistry / Atomic Structure</td>
<td>Miessler, CH 01-02</td>
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<td>01/26</td>
<td>Simple Bonding Theory</td>
<td>Miessler, CH 03</td>
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<td>01/28</td>
<td>Symmetry and Group Theory</td>
<td>Miessler, CH 04</td>
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<tr>
<td>02/02</td>
<td>Symmetry and Group Theory</td>
<td>Miessler, CH 04</td>
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<td>02/04</td>
<td>Molecular Orbitals</td>
<td>Miessler, CH 05</td>
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<td>02/09</td>
<td>Acid–Base and Donor–Acceptor Chemistry</td>
<td>Miessler, CH 06</td>
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<td>02/11</td>
<td>Exam I</td>
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<td>02/16</td>
<td>The Crystalline Solid State</td>
<td>Miessler, CH 07</td>
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<td>02/18</td>
<td>Chemistry of the Main Group Elements</td>
<td>Miessler, CH 08</td>
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<tr>
<td>02/23</td>
<td>Coordination Chemistry I: Structures and Isomers</td>
<td>Miessler, CH 09</td>
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<td>03/01</td>
<td>Coordination Chemistry II: Bonding</td>
<td>Miessler, CH 10</td>
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<td>03/03</td>
<td>Coordination Chemistry III: Electronic Spectra</td>
<td>Miessler, CH 11</td>
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<tr>
<td>03/22</td>
<td>Coordination Chemistry IV: Reactions and Mechanisms</td>
<td>Miessler, CH 12</td>
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<tr>
<td>03/08</td>
<td>Exam II</td>
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<td>03/10</td>
<td>Organometallic Chemistry</td>
<td>Miessler, CH 13</td>
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<td>03/22</td>
<td>Organometallic Reactions and Catalysis</td>
<td>Miessler, CH 14</td>
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<td>03/24</td>
<td>Homogeneous and Heterogeneous Catalysis</td>
<td>Housecroft, CH 26</td>
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<td>03/29</td>
<td>Exam III</td>
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<td>03/31</td>
<td>Bioinorganic and Environmental Chemistry</td>
<td>Miessler, CH 16</td>
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<td>04/05</td>
<td>Biomineralization: The Controlled assembly of “Advance Materials” in Biology</td>
<td>Kaim, CH 15</td>
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<td>04/07</td>
<td>Inorganic Self-Assembled Structures of Nanoparticles</td>
<td>Kumacheva, Article</td>
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<td>04/12</td>
<td>Trace Metals in Marine Microorganisms</td>
<td>Holland, CH 6.5</td>
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<td>04/14</td>
<td>The Methane Cycle: Nickel Enzymes</td>
<td>Rehder, CH 10</td>
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<td>04/19</td>
<td>Carbon Dioxide: Biochemistry of Zinc</td>
<td>Rehder, CH 12</td>
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<td>04/21</td>
<td>Inorganic Chemistry in Medicine</td>
<td>Rehder, CH 14</td>
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<tr>
<td>04/26</td>
<td>Chelation in Metal Intoxication</td>
<td>Pachauri, Article</td>
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<tr>
<td>04/28</td>
<td>Research Proposal-Submission</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.

I. 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, i.e., with pen, paper, and colored markers/pencils.

**Late Work and Make-up Exams**
There is no make-up exam for this class. Students with a university approved scheduled absence (athletics, military duty, etc.) MUST contact the instructor well in advance of the scheduled absence. Exams may be taken early in those specific cases. Students who do not arrange to take the exam ahead of time will not be eligible for this special consideration. A written excuse from the university department involved or the Office of the Dean of Students is required.

**Extra Credit**
There is no extra credit in this course.

**Cell Phone Use**
Cell phones and laptops are allowed during lectures. Before you enter the lecture hall turn OFF your cellular phone! Beepers must also be turned off or put on silent mode. Electronic interruptions absolutely will NOT be tolerated.

**Food in Class**
Food is allowed in this course.

**Missed Exam**
Students who do not arrange to take the exam ahead of time will not be eligible for this special consideration. A written excuse from the university department involved or the Office of the Dean of Students is required.

**Participation**
Students are expected to participate during the classes, this way contributing to the learning process of the group. The classes are designed as an active environment where every new concept is applied to real synthetic examples. The students are expected to participate as a team, applying critical thinking to the resolution of the different practical challenges proposed.

**J. 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 submitted. No student is eligible to receive a W without completing the official drop process by this deadline. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

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-
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.

K. 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.

L. 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.