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Course Description: This course emphasizes practical rather than theoretical approaches and requires students to develop their own problem solving abilities with respect to diverse methods used in environmental and marine chemistry. This course is designed around hands-on/minds-on case-studies using a selected series of instruments as ‘models’ for marine/environmental chemistry procedures. Most importantly, this course uses an approach of “authentic inquiry” (or problem-based learning - PBL), in its pedagogical approach, namely exposing students to authentic methods of scientific inquiry rather than a suite of algorithmic solutions to specific environmental issues. The vast majority of course activities will take place in laboratory settings rather than classroom instructions.

Course Objectives: The main goal of this course is to foster an understanding of how environmental chemists use analytical methods to address environmental issues. A parallel objective of this course is the development of an expertise in assessing the validity of analytical data in supporting research questions.

Course Outline: The approach of the course will follow a general sequence of themes that will 1) introduce the notion of the ‘authentic inquiry’ and ‘problem-based learning’, 2) evaluate basic concepts of statistics in support of analytical chemical methods, 3) apply chemical concepts (stoichiometric calculations, chemical equilibrium, kinetics) to solve quantitatively problems in marine/environmental science, 4) build gradual expertise and autonomy in problem-solving in analytical chemistry using a suite of different instruments, and 5) lead to a semi-autonomous research project based on the extensive use of a high-end instrument and seeking to address a current issue in analytical chemistry.

Course Learning Outcomes:

i) Understand stoichiometry and chemical equilibrium as foundations of chemical analyses.

ii) Apply mathematics (including basic statistics) to solve quantitative chemical problems.
iii) Competently perform a broad variety of analytical procedures and critically evaluate the results, evaluate sources of error, synthesize this information, and express it clearly in written laboratory reports.

iv) Skillfully utilize the chemical literature.

v) Maintain a laboratory notebook according to standard scientific guidelines.

vi) Understand the significance of good analytical chemistry practice in industrial and national development.

vii) Discover and appreciate the role of analytical methods in the development of chemistry related fields (i.e. medical chemistry, biochemistry, environmental chemistry, organometallic chemistry, material science).

Larger Learning Outcomes: Texas A&M University is embarking in a new educational plan which seeks to promote the commitment from students to “life long learning”. This effort requires that everyone in the A&M community value learning as a primary goal of what we do. Every student (and professor) should thus consider incorporating into his/her learning the notions of Curiosity, Initiative, Independence, Transfer, Reflection. We will try to address these concepts in our class throughout the semester. Enjoy a life-long ride!

Time and Location of Class:
Lectures: Friday, 12:00-1:50AM, OCSB 200A
Labs: Friday, 2:00-5:50PM, OCSB 200A (as well as teaching or research labs in OCSB when indicated)

No Textbook Required! (Course will be supported by lecture notes and lab hand-outs posted on the class website).

Important Information for the Fall Semester of 2010
• There is NO exam in this course. All evaluations will come from lab reports, contribution to the final research poster, lab notebooks, and attendance/participation in the laboratory activities.
• Last day for adding/dropping courses for the Fall semester is September 2nd (5 PM)
• The last day to drop with no penalty is November 4th (5 PM).
• Thanksgiving Holiday is on Nov. 23-24.
• Last day of Fall semester is Dec. 4th.

Attendance Policy:
Attendance and participation in labs is required since part of the overall evaluation is calculated based on the participation in these exercises. Information concerning absences is contained in the University Student Rules Section 7. The University views class attendance as an individual student
responsibility. All students are expected to attend class and to complete all assignments. Please consult the University Student Rules for reasons for excused absences, detailed procedures and deadlines as well as student grievance procedures (Part III, Section 45).

Grades will be based on the following:
There will be NO exam during the course. The workload will consist of

1. Prescribed lab activities involving hands-on/minds-on exercises with reports due at subsequent lab meetings. Student will complete each lab report individually (40%).
2. A final research paper based on experimental data gathered during a 3-4 weeks period on an assigned research topic. The entire group of students will work together in small teams (2-3 members per team) on a research experiment, which will ultimately be presented as a poster at TAMUG’s undergraduate research seminar in the Spring 2011. Students are expected to work as a group in the lab on the generation of the data needed to write a research report (one paper per team). This paper should be written as a professional technical manuscript in the format of peer-reviewed publications journals (see attached example). (30%).
3. Presentation of the research projects during the final class (15%).
4. Lab notebooks. Each student will turn in his/her lab notebook lab the first week, mid-semester, and at the end of the semester for the TA to grade. (15%).

Final grades will be based on your percentage of the total points possible: A (90-100%); B (80-89%); C (70-79%); D (60-69%); and F (below 60%). Some curving is likely.
The Final Projects will be due on Friday Dec 07, 12PM. No Delays.
Policy on Late Submissions of Labs and Papers: Ten percent (10%) of the grade will be deducted per day if the lab reports are submitted past the due date. Materials that are submitted more than one week late will not be accepted. No late submission will be accepted on the final paper.

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Course Syllabus
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**Web-Site Information:** The course URL can be found at [http://loer.tamug.edu/Loup/CHEM316/CHEM316.htm](http://loer.tamug.edu/Loup/CHEM316/CHEM316.htm)

**Americans with Disabilities Act (ADA) Policy Statement**
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 contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity Statement and Policy

Aggie Honor Code: “An Aggie does not lie, cheat, or steal or tolerate those who do.” Upon accepting admission to Texas A&M University at Galveston, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMUG community from the requirements or the processes of the TAMUG Honor System. For additional information: http://www.tamug.edu/honorsystem).