**Instructor:** Michelle Scherer  
**Office:** 406 IATL  
**Phone:** 5-5654  
**Email:** michelle-scherer@uiowa.edu

**Course Description and Goals**
Both engineers and chemists are dependent on aquatic chemical information for the practical purpose of rationally developing and designing technologies (e.g., how thick should the Fe\(^0\) wall be?) and understanding the fate of chemicals in natural aquatic environments (e.g., will the chromate from the Hanford Nuclear Facility reach the Columbia River?). Aquatic environmental chemistry uses two main tools to answer these questions: equilibrium models and kinetic models. This advanced course in environmental chemistry is designed to provide students with the skills necessary to apply these models, in a quantitative fashion, to the most important aspects of natural water chemistry. The course will focus on problem-based projects and critical reviews of relevant journal articles.

**Prerequisites**
Students coming into this course should have had some introduction to environmental chemistry. Students should be comfortable with basic concepts from acid-base chemistry (i.e., pKa, equilibrium coefficients, ionization fractions, log C-pH diagrams), redox chemistry (\(\Delta G\), reduction potential, Eh-pH diagrams), and precipitation and dissolution reactions (solubility products). The first homework assignment will provide a review of these concepts.

**Reading**
There are no required texts for this course, but I would strongly recommend:


I have also placed several texts on reserve in the engineering library:


Additional readings and journal articles will be available in pdf format from the class web site.

www.icaen.uiowa.edu/~cee252
**Course Requirements and Evaluation**

Evaluation for this course will be based upon the successful completion of a variety of in-class and take-home assignments. Each week will consist of one day of lecture and one day of discussion and student presentation of a relevant journal article. Every two or three weeks, I will announce that a short, in-class quiz will be given during the following class to reinforce the material, and help me to see if there are any major problems before moving on to new topics. Besides the in-class quizzes, there will be small projects which will stress problem solving, reading comprehension, data analysis, and/or written skills. Another component of the course requirements is one in-class presentation based on your review of a relevant journal article.

Quizzes, assignments, journal readings and final exam with their respective weights towards the final course grade appear below:

<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Weight</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take home assignments</td>
<td>30%</td>
<td>Group work is fine, but acknowledge who you have worked with and hand in your own work to receive credit.</td>
</tr>
<tr>
<td>In class quizzes</td>
<td>20%</td>
<td>Approximately four 15-20 minute quizzes which will be announced at least one class period before.</td>
</tr>
<tr>
<td>Paper Review</td>
<td>20%</td>
<td>Prepare about a forty minute presentation critically reviewing a relevant journal article (I'll do the first review as an example).</td>
</tr>
<tr>
<td>Paper questions/discussion</td>
<td>15%</td>
<td>Based on your participation in the class discussions.</td>
</tr>
<tr>
<td>Final Exam</td>
<td>15%</td>
<td>Last Day of Class.</td>
</tr>
</tbody>
</table>

**Other Policies and Missed Work**

Class attendance, while not mandatory, is required if you want to succeed in this course. Some of the material we will cover is not in the text, and some material is not sufficiently covered. Therefore, class time will be used to expand and discuss material in the text and journal articles, not simply restate it.