

**Chemistry 710**  
**Environmental Aquatic Chemistry**  
*TTR 5:30-6:45 PM*  
*CHE 102*

**Text Book:** Aquatic Chemistry: Stumm and Morgan

**Learning Outcomes:**

- Students will be able to differentiate between thermodynamic and kinetic models of aquatic speciation.
- Students will be able to state the limitations of thermodynamic and kinetic descriptions of chemical reactions in water and at solid water interfaces.
- Students will be able to identify the important chemical species for a particular element under defined pH and redox conditions.
- Students will be able to define complex chemical problems by identifying relevant chemical reactions and physicochemical processes in the aqueous phase and at solid water boundaries.
- Students will be able to apply chemical thermodynamic and equilibrium principles to complex problems of environmental significance.
- Students will be able to formulate chemical speciation problems in terms of mass balance.
- Students will be able to calculate the equilibrium speciation of a particular element utilizing mass balance principles and commercially available mathematical software such as Excel™, Mathcad™ and Mineql™.

**Grading:** The course grade will be based upon two midterm exams (60%), and a final exam (40%)

**Attendance:** Attendance is expected and recommended. Homework will be assigned and solutions will be discussed during class.

**CHEMISTRY 710**  
**ENVIRONMENTAL AQUATIC CHEMISTRY**

Course Syllabus:

- Aug 30: Course Objectives; Chapter 01: Introduction to Water Chemistry.
- Sept 01: Chapter 02: Thermodynamic and Kinetic Considerations  
06:  
08: Chapter 03: Acids and Bases, pH as a Master Variable.  
13:  
15: Equilibrium Calculations and Mass Balance in Aquatic Chemistry (Tableau Method).  
20:  
22: Using Thermo Software MINEQL+ and MathCad  
27:  
29:
- Oct 04: Chapter 04: The Carbonate System.  
06: Midterm Exam I  
11:  
13:  
18: Chapter 07: Precipitation and Dissolution.  
20:  
25:  
27: Chapter 06: Speciation of metal ions in solution. Hydrolysis, Complexes and Chelates.
- Nov 01:  
03: Midterm II  
08:  
10: Chapter 08: Redox, pE and/or Eh as Master variables. Biological Process and Water Composition.  
15:  
17:  
22:  
24: Thanksgiving  
29: Chapter 9,13,14: Solid solution interface. The role of particles and ion-exchange
- Dec 01:  
06:  
08:  
16: Final Exam Scheduled 6-8 pm

Syllabus and schedule are subject to revision.

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**Academic Misconduct** — Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at: <https://www.unlv.edu/studentconduct/student-conduct>.

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**Religious Holidays Policy** — Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

**Transparency in Learning and Teaching** — The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:

<https://www.unlv.edu/provost/teachingandlearning>

<https://www.unlv.edu/provost/transparency>

**Incomplete Grades** — The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student’s control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving “I” grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

**Tutoring and Coaching** — The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895- 3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

**UNLV Writing Center** — One-on- one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student’s Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

**Rebelmail** — By policy, faculty and staff should e-mail students’ Rebelmail accounts only. Rebelmail is UNLV’s official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students’ e-mail prefixes are listed on class rosters. The suffix is always **@unlv.nevada.edu**. **Emailing within WebCampus is acceptable.**

**Library Resources** — Students may consult with a librarian on research needs. For this class, the subject librarian is [https://www.library.unlv.edu/contact/librarians\\_by\\_subject](https://www.library.unlv.edu/contact/librarians_by_subject). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu/>.

**Final Examinations** — The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.

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