**CE 5319-001 & 101 Water Chemistry**

**Spring 2017**

**Instructor:** Andrew Kruzic

**Office Number:** Nedderman Hall 403

**Office Telephone Number:** 817-272-3822

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**Office Hours:** M-W 2-4 pm, Tu-Th 2-3:30, or by appointment. In addition to my posted office hours I am also available to meet with students most times when I am in my office and the door is open. However, the surest way to meet with me is to make an appointment by phone. I will normally be in my office during office hours, but if I do not have an appointment scheduled, I will not hesitate to leave my office during office hours to attend an important meeting.

**Section Information:** CE 5319-001 and 101, Course Prerequisites: CE 3334; CE 3131

**Time and Place of Class Meetings:** Tu Th 3:30 – 4:50 pm, Nedderman Hall 108

**Description of Course Content:** The goals of this course are to provide the student with a basic understanding of water chemistry and the chemical processes used in water quality control. The course will include a discussion of the theory, design, and operation of systems used for both water and wastewater treatment.

**Student Learning Outcomes:**

• Ability to apply knowledge of mathematics, science, and engineering principles to understand and solve simple environmental engineering problems

• Ability to design and conduct experiments used in the environmental engineering field and to analyze and interpret the data from these types of experiments for the design and/or operation of an engineered system

• Ability to design several components of engineered systems and processes used in treating water, wastewater, and hazardous wastes

**Required Textbooks and Other Course Materials:**

Water Chemistry, V. Snoeyink and D. Jenkins, John Wiley and Sons, 1980.

**Major Assignments and Examinations:** Weekly homework assignments, and two mid-term exams. Please note: There may be take home portions to both exams. The in-class portion of the second exam will occur on the date and time scheduled for the final exam, and the take-home portion of the second exam will be given out the week before dead week and will be due on the first day of dead week. Homework is due one week after it is assigned (usually on a Thursday). Late homework will not be accepted without the consent of the instructor.

Homework must be done using the typical engineering format of Given, Find, and Solution. Two general presentation formats are acceptable: 1) on engineering paper using pencil and very neat hand printing, or 2) printed output from a computer word processing and/or spread sheet program. In both cases the solution is given on one side only. Spreadsheet solutions must also have hand generated sample calculations. Graphs must be large enough to be easily read (typically half a page or more) and the axes must be clearly defined and labeled including units. Computer generated graphs should give the equation of the fitted line. Hand generated graphs must be done on engineering paper with a straight edge. Your solutions must be presented linearly down the page so a reviewer can easily follow your solution. Every reasonable step in your solution must be presented. Solutions in which the solve function of a calculator is used are not acceptable. Answers must contain at least 2 but no more than 4 significant digits and appropriate units. Your homework must be stapled in the upper left hand corner and your name and submitted date must be given on the first page.

**Attendance:** Attendance is not mandatory; however, no special accommodations will be made for incomplete or missed assignments and exams due to unexcused absences. Students should participate in the classroom discussions. All students are expected to attend each lecture.

**Professional Code of Conduct:** Students are expected to act in a manner consistent with a professional civil engineer. You are responsible for learning the material that makes up this course. I am responsible for helping you to learn it and determining if you have done so. Most people must do the assigned homework to learn the material of this course. My tests are designed to determine how much you have learned. To me, "learning" means understanding the material well-enough that 1) you can explain it to others so they can understand it and 2) solve problems you have not seen before. I welcome all pertinent questions in class and I am willing to spend many hours outside of class to help you learn. I also welcome any suggestions you have on how I can better help you to learn and/or determine if you have learned the material of this course. You are expected to attend every class and to show up on time.

**Grading Policy:** I reserve the right to vary slightly from the grade schedule listed below but it is highly unlikely the deviation will be more than 1 or 2 points up or down.

Homework 16%

Midterm Exam 1 42%

Midterm Exam 2 42%

Grade Basis: 85 - 100% A

65 - 85% B

55 - 65% C

45 - 55% D

< 45% F

**Make-up Exams**: No make-up exams are given except for medical or other similar hardships where advanced arrangements are made with the instructor; or in case of non-selective medical emergencies with appropriate physician’s note or documentation. Other than circumstances described above, failure to take the exam at the scheduled time will constitute a grade of zero in the exam.

**Grade Grievance Policy:** Grade grievances will be handled according to the policy described in the College of Engineering portion of the Catalog.

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

**Disability Accommodations:** UTArlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA),* and *Section 504 of the Rehabilitation Act.* All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of **a letter certified** by the Office for Students with Disabilities (OSD).Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

**The Office for Students with Disabilities, (OSD)** [www.uta.edu/disability](http://www.uta.edu/disability) or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability).

Counseling and Psychological Services, (CAPS) [www.uta.edu/caps/](http://www.uta.edu/caps/) or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

**Non-Discrimination Policy:** *The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit*[*uta.edu/eos*](http://www.uta.edu/hr/eos/index.php)*.*

**Title IX Policy:** The University of Texas at Arlington (“University”) is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated.*For information regarding Title IX, visit* [www.uta.edu/titleIX](http://www.uta.edu/titleIX) or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or [jmhood@uta.edu](http://www.uta.edu/provost/_downloads/administrative-forms/jmhood@uta.edu).

**Academic Integrity:** Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

*I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*

*I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents’ Rule* 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

**Campus Carry:** Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

**Student Feedback Survey:** At the end of each term, students enrolled in face-to-face and online classes categorized as “lecture,” “seminar,” or “laboratory” are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback via the SFS database is aggregated with that of other students enrolled in the course. Students’ anonymity will be protected to the extent that the law allows. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the west exit of the Nedderman Hall Atrium. The instructor will assist individuals with disabilities.

**Student Support Services:**:UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include [tutoring](http://www.uta.edu/universitycollege/current/academic-support/learning-center/tutoring/index.php), [major-based learning centers](http://www.uta.edu/universitycollege/resources/college-based-clinics-labs.php), developmental education, [advising and mentoring](http://www.uta.edu/universitycollege/resources/advising.php), personal counseling, and [federally funded programs](http://www.uta.edu/universitycollege/current/academic-support/mcnair/index.php). For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to [resources@uta.edu](mailto:resources@uta.edu), or view the information at <http://www.uta.edu/universitycollege/resources/index.php>.

**Course Schedule:** Text Week

Thermodynamics and Chemical Equilibrium A3 1

Acid-Base Chemistry A4 2-6

Complexes A5 7

Precipitation and Dissolution A6 7-9

Precipitation as a Unit Process 10-11

Coagulation as a Unit Process 12

Oxidation-Reduction Reactions A7 13-14

Oxidation-Reduction as a Unit Process 14-15