



CHEM 2371
WATER AND WASTEWATER CHEMISTRY
COURSE SYLLABUS
Mondays & Wednesdays, 5:30 PM – 6:45 PM

Instructor: Prof. Shray Saxena

Email: ssaxena@tamusa.edu (this is the best and fastest way to get in touch with me)

Class timings: Mondays and Wednesdays, 5:30 pm - 6:45 pm

Class Zoom link: <https://tamusa.zoom.us/j/83740457810>

Office hours (Virtual only): By appointment only. Email me any time and I will respond within the hour with my response. I am available to Zoom all days after 5:30 pm; Message/Email me and I will send you a zoom link.

COURSE MATERIALS

Textbook: Not Needed. But recommended.

Water Chemistry: Vernon L. Snoeyink and David Jenkins. ISBN 0-471-05196-9

Calculator: Scientific calculators are required for this course. Only the use of models without data storage capabilities are approved for exams. Some good calculator examples are TI-30Xa (about \$9 in amazon and walmart), TI-30X (about \$13), Casio fx-300ES Plus (about \$13) or Casio FX-300MS (about \$11).

COURSE DESCRIPTION

This course introduces chemistry of natural and polluted water and its application to water and wastewater treatment. The course also provides instruction on the principles and practice of advanced chemical and microbiological analysis for water and wastewater. Chemical and biological testing requirements of governmental regulatory agencies are examined. Course topics include principles of chemical kinetics, solute (dilute) equilibria, natural and disturbed

carbon, nitrogen, and phosphorus balance, ionic strength, and thermodynamics relevant to water chemistry. Microbiological reactions in relation to wastewater treatment are also discussed.

PREREQUISITES

CHEM 1311, CHEM 1111, CHEM 1312, CHEM 1112, WATR 1301, WATR 1302

COURSE OUTCOMES

1. Students should acquire clear knowledge of the principles of the natural water system from a chemistry standpoint, how these principles relate to water science and the world around us, and their applications in water analyses. These principles will be taught primarily through lectures, a concurrent lab, and problem solving.
2. Students should be able to understand how the chemistry of natural water changes when it is disturbed and polluted. This knowledge and skill will be the cornerstone of upper-division water sciences and treatment technologies.
3. Students should be able to apply the knowledge acquired from the course and apply to analysing and interpreting test results obtained from the concurrent water and wastewater chemistry lab.

Student responsibilities

Attendance Policy and Professionalism. Learning in this course occurs in multiple directions: teacher-student, student-teacher, and student-student. As a result, I expect participation in discussions, activities, working problems, etc. I consider attendance and punctuality to be part of participation. For these reasons, we have a strict attendance policy. Attendance is mandatory.

I take notes throughout the semester regarding attendance and participation; I use these notes as part of my subjective participation grade at the end of the course. Please refrain from text messaging during class. More often than not, it can wait. With regard to professionalism: any language, oral, written or otherwise, or general behaviour that could be perceived as sexist, racist, offensive, aggressive, or discriminatory will not be tolerated.

Absences will be excused if due to illness (medical excuse with note from health services/doctor), death of a close family member, religious holiday (please inform instructor),

official university activity, cancellation of classes/closure of the University, military duties, pregnancy & related conditions, or participation in legal proceedings.

Please Note: emailing me ahead of time about an illness and/or absence is a courteous gesture on your part, but it does not automatically mean you will be allowed to make up an exam/quiz or turn in an assignment late. It is not fair to the rest of the class to make such exceptions without a Dean's approval.

Communication. The best way to contact instructors is via email. All correspondence between professors and students must occur via University email accounts. All students have a Jaguar email account ready and working. If it is not working, contact the help desk at sahelp@tamusa.tamus.edu or at 210-784-4357. Students are expected to access Blackboard for updates on the course, announcements and other course materials. All students are strongly encouraged to come to office hours or make appointments at other times to discuss course material and ask questions. Discussions concerning grading/grades will not be addressed through email and will only be discussed during office hours or scheduled appointments.

Late Work Policy. Students will be informed about due dates and times for homework's. Work is required to be turned in on time. Late work will be subjected to a 10% penalty for the first day and an additional 20% penalty per day. For example, if a homework assignment is due Monday at 11:59pm and the student submits the homework on Tuesday at 8am, 10% will be deducted (2.5 points). If the homework is submitted on Wednesday, 30% will be deducted (7.5 points). **Late homework that is more than three days late will not be accepted.** A zero will be given to a student who does not take the exam by the due date unless properly approved by the instructor. Makeup exams due to an illness with an official doctor's note or emergency with documentation will be given at the instructor's discretion. Only requests that are made prior to the exam's due date will be considered (unless there is substantial proof that it was not possible for the student to make the request before the exam).

Electronic Devices during Exams. All electronic devices must be completely stored during exams. Academic misconduct and attempts to cheat during the exam will be pursued according to Texas A&M-San Antonio code of conduct policy. You are not allowed to

communicate with others or use any other external source during the exam. You are not allowed to leave the room during an exam.

Grading

- Attendance and participation (100 points or 10%)
- Homework (300 points or 30%)
A total of 6 homework assignments worth 50 points will be assigned throughout the course.
- Quizzes (100 points or 10%)
A total of 4 quizzes worth 25 points each will be given throughout the course.
- Exams (300 points or 30%)
Three exams worth 150 points will be given throughout the course. The lowest scoring exam for each student will not be counted towards their total score.
- Final Exam (200 points or 20%)
A comprehensive final exam worth 200 points will be given during the final exam week.

Total Points = 1000 points

$$\text{Your grade \%} = \left(\frac{\text{Total Points earned} * 100}{1000} \right)$$

Letter Grades:

A	90.00 - 100.00%
B	80.00 - 89.99%
C	70.00 - 79.99%
D	60.00 - 69.99%
F	0 - 59.99%

Schedule*

The topical coverage will no doubt change during the semester; therefore, the schedule listed should be considered tentative, except for Exam dates.

Week	Class Date(s)	Topic	Assignments due (All due on 11:59 pm on date listed)
1	Jan 22	Course Overview	None
2	Jan 27, 29	Chemistry Review - Basic Concepts; Ch 2: Chemical Kinetics	Quiz 1
3	Feb 3, 5	Ch 3: Chemical Equilibrium	HW 1 due on Monday
4	Feb 10, 12	Ch 3: Chemical Equilibrium	HW 2 due on Monday
5	Feb 17, 19	Ch 4: Acid-base Chemistry	Exam 1 (open on Wed, Feb 19)
6	Feb 24, 26	Ch 4: Acid-base Chemistry	Quiz 2
7	Mar 3, 5	Ch 4: Acid-base Chemistry	HW 3 due on Monday
	Mar 10-15	Spring Break – No Class	
8	Mar 17, 19	Ch 4: Acid-base Chemistry	Exam 2 (open on Wed, Mar 19)
9	Mar 24, 26	Ch 6: Precipitation & Dissolution	None
10	Mar 31, Apr 2	Ch 6: Precipitation & Dissolution	HW 4 due on Monday Quiz 3
11	Apr 7, 9	Ch 6: Precipitation & Dissolution	HW 5 due on Monday
12	Apr 14, 16	Ch 7: Oxidation & Reduction	Exam 3 (open on Wed, Apr 16)
13	Apr 21, 23	Ch 7: Oxidation & Reduction	Quiz 4
14	Apr 28, 30	Ch 7: Oxidation & Reduction	HW 6 due on Monday
15	May 5	Last day of classes; Final exam review	Course evaluations
16	May 7-13	Final Exam	Final Exam (open on Wed, May 7)

***These are tentative topics. Instructor reserves the right to make changes as deemed necessary.**

IMPORTANT. There will not be a CR/NC option for Fall 2021. Each student receives this information during the first lecture. It is your responsibility to read this material and be familiar with the course content, procedures, and grading.

Academic Accommodations for Persons with Disabilities: The Americans with Disabilities Act Amendments Act (ADAAA) of 2008 and the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights protection for persons with disabilities. Title II of the ADAAA and Section 504 of the Rehabilitation Act require that students with disabilities be guaranteed equal access to the learning environment through the provision of reasonable and appropriate accommodation of their disability. If you have a diagnosed disability that may require an accommodation, please contact Disability Support Services (DSS) for the coordination of services. The phone number for DSS is (210) 784-1335 and email is dss@tamusa.edu. Academic Learning Center: All currently enrolled students at Texas A&M University-San Antonio can utilize the Academic Learning Center for subject-area tutoring. The Academic Learning Center is an appointment-based centre where appointments are made through the Navigate platform. Students access Navigate through Jagwire in the Student Services tab. The Center is active on campus outreaching to students to highlight services offered. You can contact the Academic Learning Center by emailing tutoring@tamusa.edu or calling (210)-784- 1332. Appointments can also be made through JagWire under the services tab.

Counselling Resources: As a college student, there may be times when personal stressors interfere with your academic performance and/or negatively impact your daily functioning. If you or someone you know is experiencing life stressors, emotional difficulties, or mental health concerns at Texas A&M University – San Antonio, please contact the Student Counseling Center (SCC) located in Modular C, Room 166 (Rear entrance) or call 210-784-1331 between the hours of 8:00AM and 5:00PM. All mental health services provided by the SCC are free, confidential (as the law allows), and are not part of a student's academic or university record. SCC provides brief individual, couples, and group therapy, crisis intervention, consultation, case management, and prevention services. For more information, please visit www.tamusa.edu/studentcounseling

In a crisis situation, please walk-in to the Student Counseling Center (SCC) any time between the hours of 8:00AM and 5:00PM to be seen by a licensed clinician. After hours, please

contact UPD at 911 or text “HOME” to 741-741 24/7/365 to connect with a trained crisis counselor. The National Suicide Prevention hotline also offers a 24/7/365 hotline at 1-800-273-8255.

Emergency Preparedness: JagE Alert is Texas A&M University-San Antonio’s mass notification. In the event of an emergency, such as inclement weather, students, staff and faculty, who are registered, will have the option to receive a text message, email and/or phone call with instructions and updates. To register or update your information visit:

<https://tamusa.bbcportal.com/>.

More information about Emergency Preparedness and the Emergency Response Guide can be found here: <https://www.tamusa.edu/upd/index.html>.

Financial Aid and Verification of Attendance: According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. Faculty will provide the Office of Financial Aid with an electronic notification if a student has not attended the first week of class. Any student receiving federal financial aid who does not attend the first week of class will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Meeting Basic Needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact the Dean of Students (DOS@tamusa.edu) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to provide any resources they may possess.

Military Affairs: Veterans and active-duty military personnel are welcomed and encouraged to communicate, in advance if possible, and special circumstances (e.g., upcoming deployment, drill requirements, disability accommodations). You are also encouraged to visit the Patriots’ Casa in-person room 202, or to contact the Office of Military Affairs with any questions at military@tamusa.edu or (210)784-1397.

Religious Observances: Texas A&M University-San Antonio recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

Respect for Diversity: We understand that our students represent diverse backgrounds and perspectives. When we are equity-minded, we are aware of differences and inequalities and are willing to discuss them so we can act to resolve them. The University is committed to building cultural competencies, or the attitudes, skills, and knowledge that enable individuals and organisations to acknowledge cultural differences and incorporate these differences in working with people from diverse cultures. Respecting and accepting people different from you is vital to your success in the class, on campus, and as a future professional in the global community. While working together to build this community we ask all members to:

- Share their unique experiences, values, and beliefs.
- Be open to the views of others.
- Honor the uniqueness of their colleagues.
- Value each other's opinions and communicate respectfully.
- Keep confidential discussions that the community has of a personal (or professional) nature.
- Use this opportunity together to discuss ways in which we can create an inclusive environment in this course and across the A&M-San Antonio community.

The Six-Drop Rule: Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student's GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as "F" grades and will impact the student's GPA.

Statement of Harassment and Discrimination: Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equality of opportunity and human dignity. To fulfil its multiple missions as an institution of higher learning, A&M-San

Antonio encourages a climate that values and nurtures collegiality, diversity, pluralism and the uniqueness of the individual within our state, nation, and world. All decisions and actions involving students and employees should be based on applicable law and individual merit.

Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, gender identity, or gender expression. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the appropriate offices within their respective units.

Texas A&M University-San Antonio faculty are committed to helping create a safe learning environment for all students and for the university as a whole. If you have experienced any form of sex- or gender-based discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking, know that help and support are available. A&M-San Antonio has staff members trained to support survivors in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The university strongly encourages all students to report any such incidents to the university. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and other healthcare providers are required to report information about such discrimination and harassment to the university. This means that if you tell a faculty member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty member must share that information with the university's Title IX Coordinator. If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact the Student Counseling Center at (210) 784-1331, Modular C.

Students' Rights and Responsibilities:

The purpose of the following statement is to enumerate the essential provisions for the student freedom and responsibility to learn at Texas A&M University-San Antonio. All students are required to follow all policies and regulations as set forth by The Texas A&M University System. This includes the [A&M-San Antonio Student Code of Conduct](#).

Students' Rights

1. A student shall have the right to participate in a free exchange of ideas, and there shall be no university rule or procedure that in any way abridges the rights of freedom of speech, expression, petition and peaceful assembly as set forth in the U.S. Constitution.
2. Each student shall have the right to participate in all areas and activities of the university, free from any form of discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, genetic information or veteran status in accordance with applicable federal and state laws.
3. A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.
4. Each student subject to disciplinary action arising from violations of university student rules shall be assured a fundamentally fair process.

Students' Responsibilities

1. A student has the responsibility to respect the rights and property of others, including other students, the faculty and the administration.
2. A student has the responsibility to be fully acquainted with the published University Student Rules found in the Student Handbook, Student Code of Conduct, on our website, University Catalog and students must comply with them and the laws of the land.
3. A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire university community.
4. A student has the responsibility to recognize the University's obligation to provide an environment for learning.
5. A student has the responsibility to check their university email for any updates or official university notification.
6. We expect that students will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, or sexual orientation.

The Jaguar Writing Center The Jaguar Writing Center provides writing support to graduate and undergraduate students in all three colleges. Writing tutors work with students to develop reading skills, prepare oral presentations, and plan, draft, and revise their written

assignments. The Writing Center is currently holding all appointments digitally. Students can schedule appointments with the Writing Center in JagWire under the student services tab. Students wanting to work in real time with a tutor can schedule an "Online Appointment." Students wishing to receive asynchronous, written feedback from a tutor can schedule an "eTutoring" appointment. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on our website at www.tamusa.edu/Writing-Center. The Writing Center can also be reached by emailing writingcenter@tamusa.edu.

Student Misconduct. Appropriate conduct is essential to the effective functioning of the University. University policy defines unacceptable conduct, both academic and non-academic misconduct, and penalties for such behavior in The Student Handbook and The Student Code of Conduct.

Academic Misconduct Policy. Students at Texas A&M University-San Antonio are expected to adhere to the highest standards of academic honesty and integrity. Academic misconduct for which a student is subject to penalty includes cheating, plagiarism, fabrication, multiple submissions, misrepresentation of academic records, facilitating academic dishonesty, unfair advantage, violating known safety requirements and ethical misconduct. This includes holding other students to the same standards and reporting any incidents of alleged violation of the honesty policy to the instructor involved or, if necessary, to the appropriate academic department head. All students are responsible for being familiar with the Academic Misconduct Policy, which may be found in the Texas A&M University-San Antonio Student Handbook.

University policy prescribes serious consequences for acts of academic misconduct including, but not limited to, a grade of 'F' on the particular paper or assignment or a failing grade in the course. Also, a referral may be issued to the Office of Student Rights and Responsibilities where the sanctions can vary up to possible expulsion from the University. Considering the potential consequences of academic misconduct, it is obviously in students' best interests to avoid even the appearance of such behavior. If you are ever unclear whether a specific act might constitute academic misconduct, please contact your instructor for an assessment of the situation.

All written assignments must be worked on individually. All student term papers and other written assignments are subject to analysis by anti-plagiarism software. Plagiarism will result in a grade of a zero for the assignment.

Key dates

January 21	First day of classes
April 21	Last day to drop with an automatic W
April 28	Last day to drop a course or withdraw from the university
May 5	Last day of scheduled classes
May 7-13	Final exams

The complete academic calendar is available online:

<https://www.tamusa.edu/provost/academic-calendar.html>