Chem 330 Environmental Chemistry – Syllabus, Fall 2025

Course Description: 3 Semester Hours: 2 hours and 30 minutes lecture per week. This course is designed primarily for students majoring in sciences. Chemistry of the environment, including the hydrosphere, atmosphere, geosphere, anthrosphere and biosphere. Principles of chemistry are applied to understand the origins of environmental pollutants, their transport, distribution, and decomposition pathways in water and atmosphere environments. Principles of sensing and remediation of environmental contaminants are discussed. Chemists deal with these topics every day, but these concepts are also crucially important to other branches of science.

Class Time and Location: Section 01E: W 2:00-4:30 pm in STC 122

Instructor: Dr. Ben Jang; Sci 335, x5383, ben.jang@tamuc.edu

Office Hours: TW 9-10am & MT: 3:00-4:30pm or by appointment

Course Materials

Lecture textbook: Environmental Chemistry, eleventh edition. By Stanley Manahan. ISBN-13: 978-0-367-56054-6, CRC Press.

Global Learning Outcomes

Upon completion of the course, I intend for my students to have realized a number of objectives.
1. Students will be able to analyze, evaluate, or solve problems when given a set of circumstances, data, text or art. Be able to critically analyze a chemical problem and deduce a solution to the problem utilizing step-wise processes.
2. Students will be able to interpret, test and demonstrate principles revealed in empirical data and/or observable facts. Environmental chemistry requires good analytical skills. By the end of this course, you should be able to utilize mathematical skills to solve chemical problems.
3. In written, oral, and/or visual communication, A&M-Commerce students will communicate in a manner appropriate to audience and occasion, with an evident message and organizational structure.
4. Students will be able to work together toward a shared purpose relevant to the course or discipline with a sense of shared responsibility for meeting that purpose.

Course General Content Knowledge Students Should Obtain

- Know the importance of chemistry and its relationship to other disciplines and our daily lives.
- Identify factors that control the speciation of chemicals in different environments
- Distinguish cases where pollutant concentrations are controlled by transport or chemical transformations
- Present a written summary and an oral overview of an original scientific or news article
- Describe the concepts of global cycles, sources and sinks, and lifetimes of pollutants

• Calculate lifetimes and removal rates of pollutants
• Describe pollution control methods, regulations, and policies
• Describe the water pollution by heavy toxic metals and their bio-geochemical cycles
• Identify the various types of biological and chemical water pollutants and explain their effects
• Describe the water and sewage treatment process and explain the rational for each step
• Describe the make-up of matter in terms of its elemental and molecular composition
• Describe the greenhouse effect, climate change; and distinguish between fossil fuels and renewable energy technologies
• Use chemical bonding models and molecular composition to recognize potential environmental impacts of substances (*e.g.,* water solubility, acidity)
• Analyze environmental scientific data using the scientific method to apply the effects of environmental chemistry on the ecosystems
• Explain basic concepts of water chemistry and water pollution
• Describe how some chemical techniques are used to quantify the distribution and concentration of substances and use this kind of data as part of an evaluation of environmental impacts
• Demonstrate the ability to use ethical reasoning to articulate a position on important environmental issues
• Apply quantitative problem-solving skills to questions in environmental chemistry.
• Compare/ contrast the chemistry of different environments within the hydrosphere.
• Describe and analyze intersections between environmental chemistry and society including applications of green chemistry.

Course Requirements: Minimal Skills Needed

Prerequisite: The student must have completed Chem 1307 or Chem 2323 with a grade of C or better.

Grading

Your course grade will be broken as follows:

Homework and Quizzes (20%)
Attendance and participation (5%)
Midterm exam (25%)
Project presentation (20%)
Comprehensive final examination (30%)

Project Presentation: Students will give a live 12-minute oral presentation, built around the cross-section between a scientific or popular press article of their choosing (but will require my approval) and course content.

*Late work will not be accepted. There will be NO make-up exams except for those missing an exam due to an ETAMU sponsored event (such as an athlete participating in an ETAMU athletic event or a student giving a conference presentation). Prior notification of participation in such an event MUST be given and make-up exam arrangements made **in advance** of the regularly scheduled exam.*

The final exam will be comprehensive over all material covered in the class. The last drop date for the course is ***October 30, 2025***. Grading will be based on a standard percentage scale: 100-90 = A; 89-80 = B; 79-70 = C; 69-60 = D; 59-below = F. Dishonest scholarship will earn an automatic zero (0) and initiate prosecution to the fullest extent. Incomplete grades may be given only if the student

has a current average ≥70% and is precluded from completion of the course by a documented illness or family crisis. **If you miss 5 or more class periods and do not have a passing grade in the class, you may be administratively dropped from the class.**

Exam details:
During exams, students are not allowed to have the following items with them: scratch paper (unless provided by the instructor), course materials, textbooks, notes (including formula sheets), or electronic devices, including iPads, iPhones or any other type of smart phone or cellular phone, iPods, MP3 players, earphones, radios, cameras, multi-functional timepieces, computers, smart watches, or ANY device capable of accessing cellular or wireless networks.

When possible, students will sit in alternating seats, face forward at all times, and remove any clothing which might conceal eye movements, reflect images of another's work, or hide course materials for copying.

Only non-programmable calculators are allowed on exams. I recommend the purchase of one of the following calculators, which are available for approximately $10.00-$15.00: TI-30X IIS (solar) or TI-30X IIB (battery) or TI-30Xa. NO OTHER CALCULATOR TYPE IS ALLOWED. ALL
calculators will be checked before/during the exam. Non-approved calculators will be removed immediately from the student, to be returned at some point after the exam period.

Course outline:
Week 1: Environmental Chemistry: An Essential discipline in Coping with Challenges facing mankind, Chapter 1
Week 2: The Hydrosphere and Water Chemistry, Chapter 2
Week 3: Oxidation/Reduction in Aquatic Chemistry, Chapter 3
Week 4: Phase Interaction in Aquatic Chemistry, Chapter 4
Week 5: Water Pollutants and Water Pollution, Chapter 6
Week 6: World Water Crisis and Climate Change: Water Renovation and Recycling, Chapter 7
Week 7: The Atmosphere and Atmospheric Chemistry, Chapter 8
Week 8: Midterm exam
Week 9: Particles in Atmosphere, Chapter 9
Week 10: Gaseous Inorganic Air Pollutants, Chapter 10
Week 11: Organic Air Pollutants, Chapter 11
Week 12: Photochemical Smog, Chapter 12
Week 13: The Endangered Global Atmosphere, Chapter 13
Week 14: no class, Thanksgiving
Week 15: Student presentations
Week 16: Wednesday December 10: Final exam, 2-4:30 pm

Interaction with Instructor Statement

The best way to communicate with the instructor is via e-mail: ben.jang@tamuc.edu or stop by the instructor's office (Science 335) for clarification of course material and expectations.

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:
https://community.brightspace.com/s/article/Brightspace-Platform-Requirements
LMS Browser Support:
https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm
Zoom Video Conferencing Tool
https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu .

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a ETAMU campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:
https://community.brightspace.com/support/s/contactsupport

Interaction with Instructor Statement – Primary and preferred communication is through email.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described

in detail in the Student Guidebook.
https://inside.tamuc.edu/admissions/registrar/documents/studentGuidebook.pdf .
Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: https://www.britannica.com/topic/netiquette

ETAMU Attendance

For more information about the attendance policy please visit the Attendance webpage and Procedures 13.99.99.R0.01
http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx

Academic Integrity

Students at East Texas A&M University are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

Undergraduate Academic Dishonesty 13.99.99.R0.03
Undergraduate Student Academic Dishonesty Form
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/documents/13.99.99.R0.03UndergraduateStudentAcademicDishonestyForm.pdf

Students with Disabilities-- ADA 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 have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
East Texas A&M University
Velma K. Waters Library Rm 162
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
Email: studentdisabilityservices@tamuc.edu
Website: Student Disability Services
https://www.etamu.edu/student-disability-services/

Nondiscrimination Notice

East Texas A&M University will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also

permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.
For a list of locations, please refer to the Carrying Concealed Handguns On Campus document and/or consult your event organizer.
Web url:
http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

East Texas A&M University Supports Students' Mental Health

The Counseling Center at East Texas A&M University, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

Mental Health and Well-Being

The university aims to provide students with essential knowledge and tools to understand and support mental health. As part of our commitment to your well-being, we offer access to Telus Health, a service available 24/7/365 via chat, phone, or webinar. Scan the QR code to download the app and explore the resources available to you for guidance and support whenever you need it.

http://telusproduction.com/app/5108.html

AI use policy [Draft 2, May 25, 2023]

East Texas A&M University acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.
Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).
Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.
In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.
Undergraduate Academic Dishonesty 13.99.99.R0.03
Graduate Student Academic Dishonesty Form