ENVS 312 01E Environmental Toxicology

COURSE SYLLABUS: Fall 2025
Tuesday, Thursday 11:00 AM – 12:15 PM
Location: JOUR Room: 110

INSTRUCTOR INFORMATION

Instructor: Dr. Emmanuella Anang, PhD
Office Location: Science Building (STC), 241
Office Hours: Monday, Wednesday 10.30 AM – 1:30 PM
University Email Address: emmanuella.anang@etamu.edu
Preferred Form of Communication: Email

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

Textbook(s) Recommended: Title: Newman, M.C. 2010. Fundamentals of ecotoxicology. Fourth or Fifth edition. CRC Press, Taylor and Francis Group.
Software Required: R and ARCGIS or QGIS
Optional Texts and/or Materials: A. Wallace Hayes 2007. Principles and methods of toxicology. Fifth edition. CRC Press.

Course Description

This course offers a comprehensive overview of environmental toxicology, with topics covering the major classes of pollutants, their fate in the environment, bioaccumulation, mechanisms of toxicity, risk assessment and evaluation of pollutants in biological and environmental systems.

Student Learning Outcomes (Should be measurable; observable; use action verbs)

1. **Critical Thinking:** Students will be able to differentiate between fact and opinion; be able to discern between relevant and irrelevant information, recognize bias in source material, and critically examine a diversity of source material. Students will be able to describe the physical mechanisms that combine to form both normal and extreme weather patterns.

The *syllabus/schedule are subject to change.*

2. **Communication:** In written, oral, and/or visual communication, students will communicate in a manner appropriate to audience and occasion, with an evident message and organizational structure. The course is designed to present one contaminant by a student at the end of the semester where students will answer the listed predetermined questions for their preselected contaminant. Class presentation will help students to exchange their research findings on a specific contaminant to the whole class.
3. **Teamwork**: Students will be able to collaborate in teams to analyze environmental toxicology case studies. Students will learn how to work in a group, how to distribute workload among group members, and finally how to solve problems in a group. There will be equal group members for each group.
4. **Empirical and Quantitative Skills:** Students will be able understand and utilize mathematical functions and empirical principles and processes. There are calculations on how to measure the LD50, Average Daily Dose, Life time Average daily Dose, Risk factor etc. for a contaminant, how to do the risk assessment for a contaminant spill.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Algebra, engineering math, basic chemistry.
In addition to this, knowledge and skills in using Microsoft Word, PowerPoint and graphics programs. Basic spreadsheet skills, ability to navigate the learning management system, etc.

Instructional Methods

Conducting lectures, resorting to videos and visual-aid presentations, e.g., “PowerPoint” and “You tube”, solving math problems together with the students in the classroom, expecting student participation in the classroom discussions, assigning Exams and homework assignments, etc.

Student Responsibilities or Tips for Success in the Course

Turn-in all the assigned academic work; actively participate in verbal discussions; take notes and copy-write explanations during class periods; take assigned written Exams; log into the course website, regularly; complete the assigned weekly study.

Learning Strategies

Lectures
Reading assignments to be discussed in class
Analysis of Case Study Samples
Individual work, analysis of free reading homework

Assumptions, Expectations, Philosophy

University students are a select group of students soon to be professionals.
Instructors can have high expectations of student performance.
Demanding courses benefit students more than easy courses.
Assignments are due on time unless you have made a prior arrangement with me (only granted for unusual or extenuating circumstances and in case of health issues proper medical excuse is required.

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Come to class prepared, having read and thought about the assigned readings; course materials are meant to be studied, not merely read. Actively participate in class discussions; ask questions.

In university, a lot of your learning will occur outside of the classroom, during your own research, and in formal and informal interactions with your peers– both here and at meetings, correspondence, etc. Therefore, I expect you to take full advantage of ALL learning opportunities, including seminars and invited speakers.

Reading and assimilating information is a critical part of your current and continuing education. This will help you become a better writer, a more rounded individual, and expose you to subjects outside of your immediate knowledge.

Date	Topics (Book Chapters)	Subtopics
Aug. 25 – Sept 19	Introduction/Welcome	**Student and Faculty introduction** Toxicology Vs. Environmental Toxicology Evolution of Environmental Law due to Environmental Pollution
	Chapter 1 and 2 Introduction and basic principles of Environmental Toxicology. Major Classes of Contaminants and their behavior of environment.	Most used terms Major Types of Toxicants. Sources, Impacts and Occurrences of major toxicants. Transport of toxicants in the environment: Adsorption, Desorption, Diffusion, Dispersion, Volatilization
	Chapter 3 Uptake, Biotransformation, Detoxification, Elimination, and Accumulation	A. Routes of Uptake Freundlich and Langmuir Isotherm Fick's Law Active Transport and Endocytosis Reaction Orders B. Mechanisms of Biotransformation and Detoxification: Metals and Metalloids (Biomethylation, Biomineralization, Bimetallic binding) Organic contaminants (Phase I and II reactions) C. Mechanisms of Eliminations Depuration, Clearance, Growth dilution…. Multixenobiotic resistance, enterohepatic circulation, gastrointestinal excretion… Modeling for Elimination: Rate constant-based, clearance volume-based, pharmacokinetics-based models) … D. Mechanisms of Accumulations and Case Studies.
Sept 22 – Sept 23	**Quiz-1** **Exam 1**	**Sept 30** **(Exam and quiz will remain open until Sept 30)**
Sept 24 – Oct 24	Chapter 4, 5, 6 Factors Influencing Bioaccumulation Bioaccumulation from Food and Trophic Transfer Molecular Effects of Biomarker	Bioavailability from water and solid for: - Metals - Organic contaminants Factors affecting bioavailability Quantitative methods to quantify Bioaccumulation: - Metals - Organics

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	Chapter 8 and 9 Sublethal Effects of Individuals: Acute and Chronic Lethal Effects to Individuals:	Growth Development Developmental Stability Reproduction, Psychology, Immunology, Behavior Test types for Acute, Chronic, and Life stage lethality Dose-Response
Oct 27 - Oct 28	**Quiz 2 & Exam 2**	
Oct 29 – Nov 21	Assignment discussion Chapter 13	Human Risk Assessment Ecological Risk Assessment
	Risk Assessment of Contaminants	Radiation Risk Assessment
Nov 24-25 Nov 26-28	Quiz 3 Thanksgiving break	
Dec 1 - 4	Catch up with any topics that may fall behind during the semester	
	Assignment discussion	
Dec 5	**Presentation of Assignments**	
	Final submission Assignments	
Dec 8-12 Final week	Exam 3 (final exam)	

GRADING

Final grades in this course will be based on the following scale:

A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% or Below

Total points corresponding to the final letter grades
A = 451- 500 Points
B = 401- 450 Points
C = 351- 400 Points
D = 301- 350 Points
F = 300 & > Points

Weights of the assessments in the calculation of the final letter grade.
Example:

Assignments	20%
Discussions	20%
Midterm Exam	30%
Final Exam	30%
TOTAL	100%

Assessments

Grades Distribution:

3 Quizzes (10% each x 3 = 30 %)

2 Exams (15 % each x 2 = 30 %)

Final Exam 20 %

One (1) Assignment (10%)

Class Attendance and Participation (5%)

Assignment (10%)

1. Consider one organic or inorganic environmental toxicant.
2. Why are you interested of that toxicant? Example: explain about their local or regional or worldwide problems.
3. Consider one specific geographic location and specific concentration of that contaminant.
4. Chemical and Physical behavior of that specific toxicant in environment.
5. Potential methods, instruments, or models used for analyzing that specific toxicant.
6. Explain the Uptake, Biotransformation, Detoxification, Elimination, and Accumulation behavior of that specific toxicant.
7. Factors Influencing Bioaccumulation if there is any
8. Calculation and analysis of
    a. Sublethal Effects of Individuals
    b. Acute and Chronic Lethal Effects to Individuals
9. Effects of Communities and Ecosystem
10. Risk Assessment of Contaminants [Use specific method to assess the risk of contaminants]

Assignment Guideline:

3-5 pages, double space, 12 fonts, Time New Roman/Calibri.

Assignment Rubric:

a. Selection of Contaminant of Emerging Concern (CEC): 2 points
b. Writing skill to explain the problem of that specific contaminant in terms of environmental toxicological terms: 5 points
c. Calculation skills on sublethal, acute/chronic lethal effects: 2points
d. Explanation skills on risk assessment for that specific contaminant: 1 point

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce 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 TAMUC 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

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Interaction with Instructor Statement

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

TAMUC 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 Texas A&M University-Commerce 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

Graduate Students Academic Integrity Policy and Form

Graduate Student Academic Dishonesty Form

https://inside.tamuc.edu/aboutus/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10.pdf

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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
Texas A&M University-Commerce
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.tamuc.edu/student-disability-services/

Nondiscrimination Notice

Texas A&M University-Commerce 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.

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A&M-Commerce Supports Students' Mental Health

The Counseling Center at A&M-Commerce, 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]

Texas A&M University-Commerce 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.

13.99.99.R0.03 Undergraduate Academic Dishonesty

13.99.99.R0.10 Graduate Student Academic Dishonesty

Department or Accrediting Agency Required Content

COURSE OUTLINE / CALENDAR

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