



**Department of Public Health  
Environmental and Occupational Health Science**

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## **EOHS 577 Environmental Toxicology**

### **Welcome Message**

Students,

Welcome to EOHS 577 Environmental Toxicology. I look forward to this semester and all we will learn about Environmental Toxicology. We will cover everything from environmental pollutants and their fate to environmental risk assessment and decision making. I have worked on environmental toxicology research since my days as an undergraduate student in 1988 as an ecological research assistant at the U.S. Department of Energy, Savannah River Nuclear Plant Site in Aiken, SC. There I worked on radionuclides in the environment and ecosystem effects. After that, I completed my master of science degree with research focused on the impacts of acid rain on stream ecosystems in Eastern Tennessee. My first job was as an environmental scientist and aquatic toxicology laboratory manager focused on aquatic toxicity and toxicity reduction studies with industries and municipalities throughout the United States. My work included field studies assessing the impacts of industrial wastewater discharges on aquatic ecosystems through study design, toxicity testing and assessments, statistical analysis, and computer modeling. While working on my Ph.D. at the University of North Texas I conducted research on stormwater and municipal wastewater discharge impacts to stream and reservoir ecosystems. This included water quality modeling and assessing the toxicity of municipal discharges on survival and growth of aquatic organisms. I have traveled the United States working with industries, government organizations, and cities to solve their toxicity and NPDES compliance challenges. Currently, my research has changed somewhat as I conduct research on firefighters' exposures to occupational hazards, risk assessment of transported hazardous materials, and stormwater monitoring and assessments. A new research initiative we have developed is the Center of Excellence in Total Firefighter Health. This research will begin this semester.

I have been working on environmental and occupational health science research for the past 23 years as a professor at WKU. In my current role I lead the research enterprise for the WKU College of Health and Human Services, and as a professor teach in the Environmental and Occupational Health Science programs and conduct research. Currently, I work with my colleagues and students to assist cities with stormwater management and water quality compliance as a consultant. Likewise, my current work includes firefighter health research, hazardous materials transport studies, and developing a total firefighter health research program to improve the health of firefighters throughout Kentucky, and hopefully the nation.

Let's have a great semester. Please, join me in exploring environmental toxicology and together we will learn all we can this semester. If you need assistance, please do not hesitate to contact me. I am here to help you.

Sincerely,  
Dr. Ritchie Taylor

### **Course Description**

Toxicological principles and environmental risk assessment with emphasis on routes of exposure, biokinetics, and response to chemical stressors.

### **Professor**

**Ritchie D. Taylor, Ph.D.**

Professor  
Department of Public Health  
Environmental and Occupational Health Science

Faculty Fellow for Research  
College of Health and Human Services

Director of the WKU NIOSH Training Program Grant  
PI, Center for Environmental and Workplace Health

### Address

Western Kentucky  
University Department of  
Public Health  
Environmental and Occupational Health  
Science 1906 College Heights Blvd.  
Bowling Green, KY 42101

### Office

236D or Virtual Office through Zoom

### Phone

Office - (270) 745-8975 (voice messages are emailed to Dr. Taylor)

### Email

[ritchie.taylor@wku.edu](mailto:ritchie.taylor@wku.edu)

### **Course Format: Online Hybrid Course**

- 100% Online through Blackboard
- Virtual course meetings via Zoom are scheduled throughout the semester (videos of all meetings will be recorded for later viewing by students not able to attend)

- Please note that **it is not mandatory** to attend the virtual meetings in person through Zoom. You may view the recorded sessions at a later date and at your convenience. These meetings will be an opportunity for you to meet with Dr. Taylor if you so choose.

### Meetings with Dr. Taylor

Please send me an email, call my office, or leave a voicemail if you would like to discuss the course or schedule a meeting in person or via Zoom. I can assist you with advising for your career and the program, as needed.

### Course Objectives

Students will:

1. Explain principles of environmental toxicology when required.
2. Summarize the effects of major environmental agents when given exposure scenarios.
3. Statistically analyze environmental toxicant data and summarize results in comparison to regulatory limits, when given a database of environmental concentration data.
4. Evaluate environmental toxicant risks to human and ecosystem health when given or required to produce results of statistical analyses of environmental toxicant data.
5. Develop environmental and occupational management strategies when given concentration data for toxicants in the natural or built environment.
6. Describe and explain laws, regulations, and policies that govern the use and levels of environmental toxicants.
7. Design a project to assess an environmental toxicant that occurs locally and is a global concern by applying the principles of environmental risk assessment.
8. Critique methodologies, results, and conclusions presented in environmental toxicology research studies based on principles presented in the textbook and course materials.

### Course Credit

- Three (3) hours of college credit at the graduate level

### Course Format

- 100% Online through blackboard
- Lecture (online videos)
- Selected readings (Posted in Blackboard)
- Exercises (Posted in Blackboard)
- Review of literature
- Research methods
- Data Analysis and Statistical Analysis using SPSS
- Discussions
- Virtual Meetings on Zoom (these are not mandatory and will be offered throughout the semester so we can discuss the course, these will be discussion meetings)

## Course Tasks and Due Dates

- The course will be organized in Sections on Blackboard.
- Each section will have a List of Tasks with due dates.
- All due dates will be posted in Blackboard.
- Please make sure to check the List of Tasks in each section for due dates.

## Course Outline

### Section 1: Introduction to Environmental Toxicology

- Install SPSS: Log onto TopNet and go to WKU Licensed Software (<https://www.wku.edu/its/software/>)
- **Section 1 Discussion – 50pts**
- Acquire the textbook
- Textbook: Read Chapter 1
- Review ToxTutor: Introduction to Toxicology (External Links folder in Section 1)
- Review Video Lecture 1.1
- **Complete Exercise 1.1: Making it Real – Toxic Substances Information Resources – 50 pts**
- Review Section 1 Presentations and Notes
- Watch Videos Extra folder
- Review videos posted in the Videos folder
- **Complete Quiz 1 – 50pts**

### Section 2: Chemical Properties, Environmental Contaminants, Toxicity

- Read Chapters 2 and 3 in the textbook
- Review Video Lecture 2.1
- Review ToxTutor – Dose and Dose Response
- **Section 2 Discussion – 50pts**
- **Extra Credit: Biostatistics Review – Part 1 (In the Extra folder) - 20pts**
- **Complete Exercise 2.1: Analysis of Atrazine in a Local Drinking Water Supply with SPSS – 50pts**
- **Complete Quiz 2 – 50pts**

### Section 3: Dose Response, Biological Poisons and Environmental Pollutants

- Read Chapters 4, 5, and 6 in the textbook
- Review Video Lecture 3.1
- Read the First 3 Chapters of Silent Spring (see the Bookshelf folder)
- **Complete Discussion 3 – 50pts**
- Review ToxTutor: Toxic Effects, Interactions, and Toxicity Testing Methods
- **Extra Credit: Descriptive Statistics with Excel – 20pts**
- **Complete Exercise 3.1: Phase 1 – Mercury Contamination of Fish in Kentucky's Surface Waters – 50pts**

- Complete Exercise 3.2: Dose Response Estimation of Acute Toxicity Endpoints – 50pts
- Review Extra Learning Experiences: Not required to be completed
  - Dose Response Calculation
- Complete Quiz 3 – 50pts

#### Section 4: Absorption, Distribution, Elimination, and Biotransformation of Toxicants

- Read Chapters 7, 8, and 9 in the Textbook
- Review Video Lecture 4.1
- Review ToxTutor – Risk Assessment, Exposure Standards and Guidelines, and Basic Physiology
- Review Extra Learning Experience: Not required to be completed
  - Calculating a Time Weighted Average Chemical Exposure
- Complete Exercise 4.1: Environmental/Occupational Pollutant Challenge – 50 pts
- Extra Credit: Phase II – Mercury in Fish – 20pts
- Complete Quiz 4 – 50pts

#### Section 5: Practice of Toxicology, Regulatory Considerations, and Risk Assessment

- Read Chapters 19, 20, 21, and 24
- Review Video Lecture 5.1
- Review ToxTutor – Introduction to Toxicokinetics, Absorption, Distribution, and Biotransformation
- Complete Exercise 5.1: Exposure Scenario for Benzene – 50pts
- Complete Exercise 5.2: Review of Journal Article – Ecological Risk Assessment of Atrazine – 50pts
- Complete Quiz 5 – 50pts

#### Section 6: Exposures and Systemic Toxicity

- Read Chapters 12, 13, 14, 15, and 16
- Review Video Lecture 6.1
- Review ToxTutor – Excretion, Cellular Toxicology, and Intuitive Toxicology and Risk Communication
- Complete Exercise 6.1: Exploration of AIHA Exposure Assessment Tool (IHSTAT) – 50pts
- Complete Quiz 6 – 50pts

#### Required Texts and Materials:

- Textbook available for free through WKU Libraries
- Introduction to Environmental Management (Textbook link below)
- <https://ebookcentral-proquest-com.wku.idm.oclc.org/lib/westernkentucky/detail.action?pq-origsite=primo&docID=6524289>  
By Mary Theodore and Louis Theodore
- CRC PRESS

- 2021
- Second edition (557 pages)
- All materials will be provided through Blackboard

### Expectations:

- Please be willing to communicate with me if you need assistance. Please send an email or call my office. If you call and I am not in please leave a voicemail.
- Students are expected to use proper online and in person scholarly etiquette. Basically, be respectful of others at all times. Absolutely no improper language.
- Ability to communicate in writing in a clear, effective, and timely manner is a critical necessity, as you will be posting reflections, emailing, and preparing type-written exercises. Communication is a must
- Do not send emails or other text in all caps.
- Only send emails that pertain to the course.
- Be courteous and thoughtful to classmates and the professor.
- Explain all of your ideas and points within an assignment.
- Be willing to communicate openly and thoughtfully.
- Have fun learning and provide feedback on your learning experience.
- Ask for help when you need it via email.
- You are expected to turn in assignments by the due date.

### Course Sections, Exercises and Discussions

- All assignments are **due by 11:59pm** on the due date.
- Assignments must be turned in on time.
- **Late assignments will only be accepted up to 24 hours after the due date and will receive an automatic 20% reduction in the grade.**  
(Example: if the assignment is a maximum of 50 points, 40 points would be the maximum that could be scored on the late assignment)
- **Assignments will be submitted through the specific link on Blackboard for each assignment. All assignments will be posted in the Exercises Folder in the Section under study.**
- You will need to submit your assignments in Microsoft Word, PowerPoint, and/or Excel, or as requested.
- If the professor has problems opening a file you submit, you will be notified to resubmit your work.
- Please check announcements and the section under study for the course in Blackboard at least twice per week. If it were me, I would log in on Monday and check everything and then at the end of the week, at a minimum.
- Please note that emails of announcements will be sent to you WKU email address. Please check this daily during the work week, as other instructors will do the same.

- We will progress through the course a section at a time. I have planned for there to be eight sections. However, if there is a topic that we need to work on more thoroughly for your benefit I will update the syllabus and we will adjust the sections accordingly. So, we will begin with Section 1, follow the List of Tasks for that section. Then we will progress to Section 2. I may post multiple sections so you may work ahead.

### Course Grading:

- 850 points Total (see Course Outline)
  - Reflections
  - Exercises
- Grade
  - 850 - 760 = A
  - 759 – 675 = B
  - 675 – 591 = C
  - 590 – 506 = D
  - <506 = F

### Course Schedule

This is an online course through Blackboard. The content will be delivered through online Lecture Videos, readings, Discussions, Exercises, and Zoom Meetings. In person attendance at Zoom meetings **is not mandatory** as this is an online course. If there is a Zoom meeting for the course, it will be recorded for viewing at the student's convenience. You may arrange to meet with the professor through a Zoom meeting or in person. Make requests for meetings via email. Materials and content will be provided on Blackboard, with exception to the textbook. The textbook is required to enhance your knowledge of the course content.

### Attendance Policy/Expectations:

Students are expected to:

- Participate by completing assigned readings
- Participate by completing all assignments
- Participate by completing discussions
- Participate by interacting with Lecture videos and creating assignment products

### ADA Accommodation

In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located in Downing Student Union, Room 1074. The SARC can be reached by phone number at 270-745-5004 [270-745-

3030 TTY] or via email at [sarc.connect@wku.edu](mailto:sarc.connect@wku.edu). Please do not request accommodations directly from the professor or instructor without a faculty notification letter (FNL) from The Student Accessibility Resource Center.

### **Pregnant and Parenting Students**

Western Kentucky University does not discriminate against any student or exclude any student from its educational programs or activities, including classes or extracurricular activities, on the basis of pregnancy and/or pregnancy-related conditions such as, but not limited to, childbirth, false pregnancy, termination of pregnancy, or recovery therefrom. Students who seek pregnancy or pregnancy-related accommodations should make their requests as soon as possible via WKU's Title IX Website at [www.wku.edu/titleix/](http://www.wku.edu/titleix/) under the heading, "Pregnancy or Pregnancy-Related Conditions." Students can also contact the Title IX Coordinator, Ena Demir, via email at [ena.demir@wku.edu](mailto:ena.demir@wku.edu) or by phone at (270) 745-6867 to request accommodations or seek assistance. We encourage students and faculty to work together to establish a plan that allows the student to complete the class and coursework without jeopardizing academic integrity and course standards. The Title IX Coordinator can help facilitate conversations between students and faculty regarding appropriate and reasonable accommodations.

If you are a WKU student and believe that you have experienced an incident(s) of discrimination or harassment based on pregnancy (or pregnancy related conditions or issues), please report it to the Title IX Coordinator via email at [ena.demir@wku.edu](mailto:ena.demir@wku.edu) or by phone at (270) 745-6867.

Additional resources for pregnant and parenting students can be found on WKU's Title IX Website at [www.wku.edu/titleix/](http://www.wku.edu/titleix/).

### **Title IX – Discrimination and Harassment**

Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU's Sex and Gender-Based Discrimination, Harassment, and Retaliation (#0.070) and Discrimination and Harassment Policy (#0.2040). Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Executive Director, Office of Institutional Equity/Title IX Coordinator, Ena Demir, 270-745-6867 or Title IX Investigators or Michael Crowe, 270-745-5429. Please note that while you may report an incident of sex/gender based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's Counseling and Testing Center at 270-745-3159.



**WKU Syllabus Information Links for Students to Review**  
<https://www.wku.edu/syllabusinfo/>