



## IPAK-EDU

### Syllabus - Environmental Toxicology A: Ecosystems & Human Health

Fall 2021

Instructor: James Lyons-Weiler, PhD

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**Live class meetings: Thursdays @ 1PM via Zoom**

**If you miss a class, don't worry. Lecture videos will be available after each class.**

**Course description:** In a series of live online presentations and discussions, students will learn the fundamentals of environmental toxicology and become well-informed and primed for discussions in the public sphere. There will be recommended readings, additional recommended videos, recommended books. There are no quizzes or exams. Students are encouraged to think of questions during each lecture to be ready to facilitate the live discussion after each lecture.

Optional Writing Project: Each student will select and read 1 study cited by Dr. Lyons-Weiler and prepare a short critical evaluation of that study in the form of a term paper with the following sections: **1. Summary of the study. 2. Findings. 3. Strengths. 4. Limitations. 5. Impact on Human and Ecosystem Health**

NB: This is the first of two courses in Environmental Toxicology. In Environmental Toxicology B (following term) Students who have had Environmental Toxicology A will pick a favorite topic, find a study or report, and prepare a presentation for the rest of the class. Students are encouraged to think about this second class as you do your readings in preparation for the topics for each class.

#### **Lecture Schedule Topics (15 or 16 lectures in total, tentative, subject to change)**

1. Background and Course Overview  
Case examples of disasters
2. Developmental Biology overview
3. Categories of Toxins  
*Teratogens, mutagens, carcinogens, reproductive toxins, neurotoxins/excitotoxins, nutriotoxins, immunotoxins, Stockholm Conference (Workbook)*
4. Concepts of Toxicity/Measuring Toxicity/Endocrine Disruptors  
*Acute vs. Chronic, Dose toxicity, LD50, Pharmacokinetics of serum/plasma-soluble pollutants, whole-body toxicity*
5. Evidence and Determination of Causality  
*Causality (direct, indirect, synergistic), Hill's Criteria, Levels of Evidence in Scientific Studies (association, dosage response, reversibility)*
6. Air Pollution
7. Water Pollution
8. Food Pollution
9. Toxins in the Home, School & Workplace  
*Mold, EMF, PVC, PCBs*

10. Carcinogens and Mutagens, Hallmarks of Cancer
11. Teratogens
  - Developmental Neurotoxicology
12. Reproductive Toxins & Hormone Mimics
13. Immunotoxins
14. Nutriotoxins
15. Metals
16. Flame Retardants
17. Pesticides and Herbicides
18. Microplastics
19. Solvents/Cleaners
20. Forever Chemicals
21. Pharmaceutical toxins
22. Other, Case examples of cleanups