Instructor: Helene K. Gardner, Ph.D. email: hkgardner@es.ucsb.edu
Please be aware that there is another hgardner on campus. Please take care when emailing me that you do not inadvertently email her.

Class Time and Location: W/F 2:00-3:15; Girv 2120
Office Hours: I like to hang out after class W/F (12:40-1:40 or so) in the UCen by the windows by Subway; feel free to drop by; I’ll be in my office (Bren 4017) T/Th 2:15-3:45 pm. If you can’t make any of these times, I’m happy to make an appointment to see you at a mutually-agreeable time and location.

Course Description: This second of the two-quarter sequence in Toxics in the Environment expands on the fundamentals introduced in the first course (routes of exposure, absorption, distribution, target organ, metabolism, sequestration, excretion, dose, response, quantal response, LD50, carcinogenesis, toxicant, toxin, and the toxicities of specific metals and radiological hazards). This quarter will use organic toxicants to explore such topics as reproductive toxicity, teratogenesis, and, again, carcinogenesis. Again, any study of toxicology is basically an examination of the chemistry of a toxic substance and then an examination of how that substance interacts with living systems. There is, therefore, an emphasis in this course on chemistry and biology.

Prerequisite: successful completion of ENVS 120A


Course Objectives:
Learn fundamental concepts in environmental toxicology
Learn basic facts in environmental toxicology
Observe, learn, and practice problem-solving skills
Practice finding information, evaluating its veracity, developing an answer to a question, and presenting that answer clearly
Improve writing skills and practice writing in scientific format

Grading: A scientist must have a working knowledge of her subject matter committed to memory. Developing hypotheses requires creativity, but one cannot be creative in a vacuum; creativity uses basic information as a springboard. If you don’t know any basic information, it takes the spring out of your board.

For example, if seals in a sea are failing to breed, scientists are called on to come up with an explanation. A hypothesis based on fact—wasn’t there a similar epizootic off Greece twenty years ago, and wasn’t it viral—rather than ignorance is going to have a greater chance of being correct in the long run. **I want you to know some fundamental toxicological concepts (objective 1, above) and some basic toxicological facts (objective 2, above) and where to**
find information, how to evaluate its veracity, and how to use it to answer a question or solve a problem (objective 4 above).

Having said that, I understand that you are emerging scientists. Memorization usually comes through repeated use. One way to get that is to come to class and hear me use the same new words correctly over and over. Memorization will be required. You are strongly encouraged to practice the vocabulary and concepts throughout the quarter because, as you know, there are as many new words in an introductory science course as there are in a foreign language course, so making flash cards, and studying them in your spare time is highly recommended. I also recommend studying in small groups and quizzing each other on the contents of your notes.

Also important to scientists is the ability to solve problems. Sometimes this involves simply putting the pieces of a puzzle together, sometimes it involves creativity. I am looking for you to develop problem-solving skills in this course (objective 3, above). That, more than memorization, is what the practice of science entails. To practice those skills, class will sometimes be dedicated to problem-solving sessions and other times ask you to synthesize material as it is presented. In addition, some homework assignments will ask you to simply go find information and present it in tabular form (objective 4, above). Other homework assignments will ask you a question for which you will do research and write a paper (objective 5, above). Expect homework weekly.

Grades may be determined as follows (a formal contract will be developed and signed):

- **Attendance:** 10%
- **Weekly homework:** 60%
- **Midterm:** 10%
- **Final Exam:** 20% (Monday, March 19 4-7pm. Please be there.)

 **Attendance** means showing up on time and staying until the bitter end. If you show up late, leave early, or are distracted during class by all the nifty stuff your cell phone can do or the insides of your eyelids you’ll miss some of the course material. I work hard to make the presentation coherent; if you miss part of the presentation, it will be…less coherent. You also won’t get full credit for attendance. I positively reinforce behaviors that old people hope young people learn. Showing up on time is a big part of success. However, if you don’t want to come to class, you don’t have to. Contract for those points to be distributed elsewhere. If you fail to contract, the above default will apply.

 **Homework** is the largest part of the grade for this course. The opportunity for turning in work that is not your own is great when the work is done outside of class. Therefore, the student code of conduct will be enforced with vigor. Cheating will not be tolerated. If student work is found to be 50% or more unoriginal (without appropriate citation), or if other overwhelming evidence of unoriginal work is present in allegedly original work, it will be given a zero. Period. Cheating is also a waste of time. A better use of your time would be to learn this material and do the work yourself.

 **Late work** will not be accepted. This is considered to be work that is submitted after the due date.
However, the lowest score of the weekly homework grades will be dropped. What that means is you can get your weekly schedule muffed up and not have it affect your grade. If whatever is muffling up your weekly schedule continues beyond a week to muffle up your ability to do the work for this class, it will affect your grade UNLESS IT IS CATASTROPHIC (please see me for the definition of catastrophic). I understand that muffle ups happen, but I don’t like having to decide whose muffle up is legitimate and whose isn’t, so, after muffling up (and, therefore not turning in homework) once, no muffle up will be accepted (a score of zero will be entered). For those of you who will muffle up early in the course, asking for a second homework grade to be dropped won’t work, so try to put off muffle ups as long as possible.

Extra credit will not be given. My stock answer to requests for extra credit goes something like, “I want you to learn what I tell you I want you to learn, so learn it. Your time is better spent learning that than learning stuff I really don’t care whether you learn or not. Further, if you don’t have time to learn the stuff I want you to learn, how on earth are you going to have time to learn extra stuff? Spend your time learning what I want you to learn.”

The final exam is Monday, March 19 from 4 to 7 pm. Please plan to be there for the exam. Memorization of material will be necessary, but you will have had nine weeks to become familiar with it.

I am always happy to meet with you during office hours or, if that doesn’t work with your schedule, by appointment at a mutually-agreeable time and even location, however I am not eager to re-give a lecture that I already gave because you missed it. Please have a class buddy that you can contact to get notes from in the event that you miss lecture. If your buddy’s notes are unclear, I am happy to help you, but seeing me is not a substitute for first getting the notes from another class member.

Tentative topics in tentative order of appearance:

“What’s Wrong with the Baltic Seals?” Problem-Solving
Pollutant transport in aquatic systems
Reproductive toxicology
Developmental toxicology
Teratology
Hormone agonists and antagonists
Yusho Problem-Solving
A Civil Action: Halogenated hydrocarbons
“Ghosts of Viet Nam” Problem-Solving
Pesticides
Carcinogenesis re-visited