NOTE: This is the SPRING 2014 Syllabus, SPRING 2015 will be similar

IB 485: ENVIRONMENTAL TOXICOLOGY AND HEALTH  
(ENVS 431, CHLH 461)  
165 Noyes Laboratory  T-Th 11:00-12:20  
WEBSITE: https://moodle.life.illinois.edu/login/index.php

Professor:  
Bettina M. Francis  Office hours: by arrangement  
677 Morrill Hall  e-mail: bfrancis@illinois.edu  
(217) 333-5136

IB 485 explores toxicological, environmental, public health, occupational and ecological aspects of the use and release of toxic substances in the environment; features case histories of environmental contamination that illustrate ecological, health, and social aspects of pollution; emphasizes biochemical mechanisms and ecosystem consequences.

Tentative Schedule of Lectures: spring 2014

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Course Introduction</td>
</tr>
<tr>
<td>23</td>
<td>Acute Toxicity</td>
</tr>
<tr>
<td>28</td>
<td>Chronic Exposure, Delayed Effects</td>
</tr>
<tr>
<td>30</td>
<td>Neurotoxicity</td>
</tr>
<tr>
<td>February</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Toxicity of Metals</td>
</tr>
<tr>
<td>6</td>
<td>Persistence and Bioaccumulation</td>
</tr>
<tr>
<td>11</td>
<td>Reproductive Toxicology</td>
</tr>
<tr>
<td>13</td>
<td>Developmental Toxicology</td>
</tr>
<tr>
<td>18</td>
<td>Genetic Toxicology: Populations</td>
</tr>
<tr>
<td>20</td>
<td>Genetic Toxicology: Molecular</td>
</tr>
<tr>
<td>25</td>
<td>Mechanisms of Carcinogenesis</td>
</tr>
<tr>
<td>27</td>
<td>TERM PAPER TOPICS DUE (undergraduates)</td>
</tr>
<tr>
<td>March</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ecosystems and Ecotoxicology</td>
</tr>
<tr>
<td>6</td>
<td>Water Pollution: Transport &amp; Persistence</td>
</tr>
<tr>
<td>11</td>
<td>Sources and Fates of Aquatic Pollutants</td>
</tr>
<tr>
<td>13</td>
<td>Predicting Disaster: Model Ecosystems</td>
</tr>
<tr>
<td>18</td>
<td>MidTerm Examination</td>
</tr>
<tr>
<td>20</td>
<td>Pesticides</td>
</tr>
<tr>
<td>Mar. 24-28</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>SPRING BREAK</td>
</tr>
<tr>
<td>April</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Hazardous Waste Disposal</td>
</tr>
<tr>
<td>3</td>
<td>Environmental Justice?</td>
</tr>
<tr>
<td>8</td>
<td>TERM PAPER DRAFTS DUE (optional)</td>
</tr>
<tr>
<td>10</td>
<td>Radiation: ionizing and non-ionizing</td>
</tr>
<tr>
<td>15</td>
<td>Energy: Risks, Costs and Benefits</td>
</tr>
<tr>
<td>17</td>
<td>Air Pollution: transport and transformation</td>
</tr>
<tr>
<td>22</td>
<td>Air Pollution:: Ozone</td>
</tr>
<tr>
<td>24</td>
<td>Air Pollution: Acid Precipitation</td>
</tr>
<tr>
<td></td>
<td>Environmental Economics</td>
</tr>
</tbody>
</table>
TERM PAPERS DUE (unless draft was submitted)

29 Risk Assessment and Risk Management

May 1 Environmental Policy in Practice

TERM PAPERS DUE (unless draft was submitted)

29 Risk Assessment and Risk Management

May 1 Environmental Policy in Practice

6 Environmental Policy in Practice – 2

LAST DATE FOR TERM PAPERS

14 FINAL EXAMINATION, 7-10 PM

COURSE POLICIES

TEXTBOOKS (optional):

Elements of Style, 4th edition, W. Strunk, Jr. and E.B. White, Longman, 2000 (You may substitute any other manual of style that you already own or prefer.)


WEBSITE:

We will use Moodle (https://moodle.life.illinois.edu) for short assignments and online discussions.

Powerpoint slides will be posted on the website. Save a tree: please do not print them unless absolutely necessary.

The text (but probably not tables or figures) from Toxic Substances in the Environment will also be posted as background information.

EXAMINATIONS and GRADING:

Grades will be based on short written assignments and class discussion (30%), a term paper (35%), and a final (35%). I do give +/- grades. The final will include short and long essay questions, and will not be machine-gradable.

There will be one conflict final, with time arranged to accommodate all students with University-defined conflicts. This conflict exam will then be open to any student who wishes to take it. (Note that the official final is in the evening.

Some old exams will be available on the website before the final, primarily to show the types of questions I ask. Because this course changes from year to year, do not assume that all the material on old exams is relevant, or that the old exams cover all possible topics for this semester.

COURSE POLICIES

I do not take attendance. You are responsible for finding out what material was covered and what assignments made if you miss class. If you have a serious reason for an absence, I will provide notes of the lecture. If you are absent as a matter of convenience, I expect you to get this information from other students.

Failure to complete any part of the course work (whether exams or papers) will result in a 0% for the missing work. If/when the missing work is completed, the grade will be altered in accord with University rules, possibly with deductions for late work.

ACCOMMODATIONS:

Students with disabilities are entitled to reasonable accommodations of their disabilities. Accommodation is also available for a student's religious beliefs. Both are a matter of right, not favors I grant. If either applies to you, please tell me as soon as possible so we can arrange the appropriate accommodation. The student is the authoritative source for these issues, but please come and talk to me, even if your situation is not strictly according to the student code definitions.

TERM PAPERS:
The term paper is a major part of this course. It is intended to give you a chance to explore a topic that interests you. Therefore I set very wide boundaries on permissible topics. There should be some connection between your topic and the focus of the course (which is on chemicals in the environment) but the connections need not be obvious. For example, I have allowed papers on desertification, *Pfisteria*, and tumors in sea turtles, because in each case there is a possibility that chemical pollution contributes to the problem. *If in doubt whether your favorite topic is OK, ask!*

**Drafts and due dates:**

Term papers will be due on 24 April. Extensions from the 4/24 due date can be requested for sufficient cause. ("The dog ate my disk" is sufficient cause. So is “I have... taxes due / n exams / minor surgery... that week"). Extensions beyond 6 May, the last day the class meets, will be allowed for serious reasons only. (“I have ... papers due / exams / minor surgery ... that week” is not sufficient.)

I will review drafts of term papers, provided these are submitted on or before 4/3. Drafts submitted after that date will be reviewed as time allows – no guarantees. For a realistic assessment, drafts should be complete papers, not outlines or partial drafts. I will also look at outlines and partial papers, but cannot give these a realistic grade.

Final versions of term papers for students submitting preliminary drafts will be due on the last day of class (5/6), and **must** be accompanied by the graded draft.

**Grading:**

All papers, including drafts, must be 'typed'; hand-written papers are not acceptable except under unusual circumstances. If you think this applies, please talk to me as soon as possible.

The text of the paper should be approximately 10 pages long (double-spaced, 10-12 cpi); only in rare instances will a shorter paper contain enough information to get an A (it has happened). There is no maximum length.

Papers are graded on information content and on the style in which the information is presented. "Content" refers to the substance of the paper, its coherence, and the logical development of the presentation; "style" includes grammar, syntax, punctuation, appropriate vocabulary. The overall grade for the paper is the average of the style and content grades. (See additional comments below)

There are many controversial issues in environmental toxicology. If your paper deals with one of these, I will grade on how well you present the information, without regard for either your or my position on that issue. It is also all right just to describe the controversy, without taking a stand. It is, however, important to present facts rather than emotional diatribes.

I will scan several term paper drafts, with the grades they got, and place them on the website.

**Style:**

*Spelling, grammar and syntax are graded in all term papers.* I am very fond of the English language, and react angrily to its abuse.

Use Strunk and White's *Elements of Style* as a guide to good writing. Use words you are sure of. Malapropisms do affect your grade adversely. Organize your topic, and don't repeat yourself to increase the length of the paper. Poor organization lowers your grade. Have someone else read a draft of your paper to see if it makes sense!

Keep your sentence structure simple, unless you can handle complex syntax. Slang, colloquialisms, and jargon should ordinarily not be used. (There are exceptions. If you are a good writer, a colloquial style adds interest to a paper. If you think this applies to you, it would be a good idea to submit a draft: a poorly written effort at a humorous style tends to be downgraded.)

If you find yourself repeatedly stringing adjectives together, reconsider your topic. If I think you are padding the length of the paper, it will hurt your grade. Add more material – for example, by broadening the topic.
Neat corrections in ink are acceptable, even on the final paper. (Please save a tree: don't redo a page for a minor typo! Just correct it neatly.) When you are all done, proofread your paper, or have someone else proofread it.

References:

Cite only items you have actually read. If you read an article by Jones, but only talk about the article by Smith that Jones discusses, you still cite Jones. A reference must ordinarily include: title, author's name, source publication, and year published.

The easiest style to manage (in my opinion) is to cite the author and year in the text, and have the full list of citations, in alphabetical order, at the end of the paper. It is also OK to use numbers in the text, and list citations in the order in which they were cited (but this can get very tricky if you reorganize your paper!). There should be articles or books with references among your sources -- pick a style you like, and copy it. I don’t require page numbers to be given in the text. I like a style that avoids unnecessary repetition, but I don’t penalize for any style that is complete and consistently used.

For books, it is customary to list all authors' last names and initials, the publisher and the city (but not the country: e.g. – Springer Verlag, Heidelberg). You need not cite page numbers, unless you are citing one article in a multi-author book. Treat those like journal articles, plus book information.

For papers in journals, give last names and initials of all authors, 1st and last page number, journal and volume number, and year. Don't worry about month or week.

Newspapers and news-magazines are sometimes complicated. Do the best you can. It's OK just to cite by: name of paper, title, and date, but if there is a by-line, give the guys credit! They work hard writing these things.

Government publications: if there is no obvious author, cite the agency or company (eg, EPA, NAS; acronyms suffice), plus title, publication number, and year. If there are obvious authors, cite under their names - but if the 'authors' are 15 people on a committee, skip them and merely name the committee.

For web-sites, give the URL and a title, and when you accessed it - by month, at least. If there is an author, list article under his/her name.

Note -- If you access a book, report, or journal article on the web (but the item has been published in hard copy) cite the hard copy information. It is more permanent that the website.

Content:

Term papers may deal with any aspect of environmental toxicity. The content may be descriptive, analytical or polemical, and need not reflect my views. A list of some topics suitable for term papers is appended. This is NOT an exhaustive list; any chemical with environmental ramifications is appropriate, and a paper may also focus on biological, chemical, engineering or social aspects of an environmental situation. However, if the subject has been covered in lecture, both content and sources must differ from the lecture material. You will not get credit for information presented in the(optional) text book, or in lecture, even if you got it somewhere else.

References are obligatory, and should consist of sophisticated material. By the time one summarizes an article from Science News or Newsweek, the information content is too low for this course. Trust me: the following sources and others like them are inadequate if they are your major sources of information: Science News, Business Week (and other weekly news magazines, including The Economist), The Wall Street Journal, The New York Times, Chemical and Engineering News, Environment, Forbes, Audubon (and other conservation magazines); daily papers.

Please use enough sources that you do not unintentionally plagiarize. It is remarkably easy to regenerate the original phrasing from notes when only 2 or 3 sources are used.

Use of the Internet: It used to be almost impossible to write a good (A or B) term paper using only Internet sources. It is still very difficult. Most environmental material on the Internet has a lower information content than is required for a term paper in this course. Exceptions are internet sites that provide access to journals, such as PubMed; some government sites; and some university sites, such as
ExToxNet. However, even ordinary Internet sources are excellent supplementary sources of information. They may also provide entry into the printed literature. For Web sources, cite the complete URL, and the date of access.

**Warning:**

To submit a term paper for 2 courses, both instructors must approve. Otherwise the paper is unacceptable and you may be charged with cheating. 

Downloading papers (or selections of text) from the web, is plagiarism, which is covered by university rules against cheating.

**A Partial List of Topics for Term Papers.** (Asterisks [*] denote topics that will be covered to some extent by the lectures. If you have a strong interest in such a topic, you should be able to find ample information that I do not discuss in class. Otherwise, avoid these topics.)

**Toxicology:** Almost any chemical in commercial use for which enough information is available. Avoid chemicals that are discussed at length in the text, unless you have a different focus. Other possibilities: chemotherapeutic agents, nuclear power; the health effects (if any) of ozone, electromagnetic forces, or irradiation of foods.

**Environmental effects of:** conservation tillage, integrated pest management, irrigation, strip mining or its repair, deforestation, species extinctions, nuclear explosion, volcanic eruption, insect eradication programs, habitat destruction, sustainable agriculture, organic farming, the 'Green Revolution', genetically modified crops, other genetically modified organisms, accidental or deliberate importation of foreign species.

**Genetics:** gene therapy (general or for a specific disease), health or environmental effects of genetically modified organisms; oncogenes and carcinogenesis, recombinant DNA, in vitro genotoxicity assays; ethics of genetic testing or cloning.

**Miscellany:** laws regulating: pesticides, emissions to water or air, automobile fuel efficiency; the economics of such laws; incineration technologies, waste reduction technologies, garbage (disposal, reduction, origins); risk assessment, risk management, risk perception, other regulatory problems; cost/benefit decisions for water treatment, specific pesticides, industrial chemicals; racial or class inequities in exposure to chemicals.

---

1 Suggestion: look at products, byproducts or intermediates in the field you plan to work in.

2 For example: I discuss thalidomide as a cause of birth defects. Either its mechanism of action or its emerging uses would make an excellent topic.

3 But keep it factual.

4 Preferably from agricultural or biological journals; sociologic aspects seem difficult to write up well, based on about a dozen poor papers over the years.

5 For example: gypsy moth, Mediterranean fruit flies ('Medfly'), spruce budworm, Asian longhorn beetle. A more general paper on principles of integrated pest control might be easier to write, however.

6 For example: is there an ethical difference between therapeutic cloning and reproductive cloning? Why or why not?