

**CHEM 336/TOX 336 Environmental Chemistry and Toxicology**  
**Course Outline: Spring Semester 2004**

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*You are welcome to contact me at any time in person, by phone or by e-mail*

**Meeting Times:** Tu, Th 8:30-9:50 in Axelrod Room 117

**Required Text:** Environmental Chemistry, 2<sup>nd</sup> Ed., 1994 by Nigel J. Bunce, available at the U of G Bookstore. You may optionally purchase the Answer Guide to the problems.

**Course Description:** The chemistry of the natural environment; the influence of pollutants upon the environment, including methods of introduction of pollutants to and removal of pollutants from the environment. Credit weighting = 0.50.  
*Please note: students with standing in CHEM 1310 may not take this course*

**Evaluation:**

One in-class assignment	15*
One in-class midterm test	30
One 5-8 page opinion paper	20*
Final examination (2 hours)	35
Total	100

\* More details will be available on the CHEM/TOX 3360 web site. See [www.chembio.uoguelph.ca](http://www.chembio.uoguelph.ca) and follow the link to CHEM/TOX 3360

**Problems:** Numerical problems will be assigned week by week. Most will be from the text-book. *I strongly recommend working the problems in small groups; be sure to ask for help if you are having difficulty*

**Exams:** These will comprise a combination of short answer and numerical questions.

**Lecture Notes:** I will use transparencies in class. These will be available on the class web-site.

## Lecture Schedule:

May 6	Introduction: review of thermodynamic and kinetic concepts relevant to environmental chemistry
May 11	Finish Introduction. The atmosphere; environmental cycles and residence times
May 13	Temperature profile of the atmosphere; greenhouse gases and climate change; Kyoto accord; ozone balance in the stratosphere
May 18	Chlorofluorocarbons; Montreal protocol; CFC replacement compounds
May 20	<b>In-class assignment:</b> write a one-page abstract of an assigned article, plus 1-2 numerical questions
May 25	Pollution in the troposphere: nitrogen oxide cycle; formation of the hydroxyl radical
May 27	Photochemical smog
June 1	Secondary pollutants; air toxics. Particulate matter in the lower atmosphere
June 3	Indoor air quality: occupational hygiene
June 8	Radioisotopes in the environment
June 10	Dissolved gases in natural water: O <sub>2</sub> , CO <sub>2</sub> ; Henry's law
June 15	Dissolved solids in natural water: alkalinity and hardness; water softening; water use in irrigation
June 17	Acid rain: nitrogen and sulfur oxides in the atmosphere; biological effects and abatement methods
June 22	Drinking water: chlorination; chlorine demand curves
June 24	Alternatives to chlorination
June 29	<b><i>In class test: material up to and including June 17</i></b>
July 1	Canada Day: No classes
July 6	Sewage treatment; waste treatment
July 8	Chlorine and its compounds
July 13	PCBs and dioxins: chemistry and sources; toxicity. <b><i>5-8-page opinion paper due</i></b>
July 15	PCBs and dioxins: toxic equivalency factors; Phase I/Phase II metabolism
July 20	Brominated diphenyl ethers; endocrine disrupting compounds; pulp and paper industry
July 22	Metals in the environment: mercury and lead
July 27	Metals in the environment: arsenic and acid mine drainage
July 29	Review
August 4	<b><i>Final examination: 2 hours, 11:30-1:30: emphasis on material since June 17</i></b>