

CHEM 336/ TOX 336 Environmental Chemistry and Toxicology

Course Outline: Winter Semester 2005

Instructor: Dr. Kate Stuttaford
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Office hours: By appointment only
Meeting Times: Tuesday/Thursday 8:30 to 9:50 in Axelrod 117

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 131 should not take this course.

Required Text: Environmental Chemistry, 2nd Ed., 1994 by Nigel J. Bunce, available at the UofG Bookstore. You may optionally purchase the Answer Guide to the problems. Copies of both books are on reserve at the library.

Other References: “Environmental Chemistry” C. Baird provides supplementary reading for some topics discussed in this course and is on reserve for 2-hour loan from the Library Reserve Desk.

The course website contains links to government and other environmental sites that can be useful in explaining certain subjects. The website can be found through the Chemistry and Biochemistry department site. Please remember that information posted on the internet is not always reliable and that careful consideration must be given to the source.

Evaluation:	Two in-class tests (80 minutes each)	50%
	1 in-class assignment	10%
	1 take-home assignment	10%
	Final Examination (2 hours)	30%

Problems: Numerical problems will be assigned week by week. Most will be from the textbook. Where material has been added to the course, relevant problems will be provided. 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. It is highly recommended that you do the assigned problems as part of your study strategy for the exams. Attendance at review classes is also strongly recommended as part of a conscientious approach to study.

Assignments: Assignments will be further explained with a handout at the appropriate lecture. Late assignments will be accepted but with a 5% penalty per day.

Lecture Schedule:

Date	Lecture topic	Chapter
Jan 13	Introduction: review; the atmosphere; environmental cycles and residence times	1.1-1.2
Jan 18	Solar energy/ photochemistry; Greenhouse gases and climate change; Kyoto	1.3-1.5
Jan 20	Greenhouse gases and climate change class discussion; Ozone balance in the stratosphere	2.1-2.4
Jan 25	Montreal protocol; CFCs/ replacement compounds	2.5-2.8
Jan 27	Pollution in the troposphere; Formation of the hydroxyl radical; Photochemical smog	3.1-3.5
Feb 1	Secondary pollutants; air toxics; particulate matter in the lower atmosphere	3.6-3.9
Feb 3	Indoor air quality: occupational hygiene; Review for term test	4.1
Feb 8	Term Test 1: Chapters 1-3	
Feb 10	Indoor air emissions; radioisotopes in the environment	4.2
Feb 15	Dissolved gases in natural water; Henry's law	5.1
Feb 17	Dissolved solids in natural water: alkalinity and hardness; water softening In-class assignment	5.2
Feb 22	READING WEEK	
Feb 24	READING WEEK	
Mar 1	Acid rain: nitrogen and sulfur oxides in the atmosphere Take-home assignment	6.1-6.5
Mar 3	Acid rain: biological effects and abatement methods	6.6-6.8
Mar 8	Drinking water: chlorination; Review for term test	7.1-7.3
Mar 10	Term Test 2: Chapters 4-6	
Mar 15	Alternatives to chlorination; Sewage treatment	7.4-7.8, 8.1
Mar 17	Treatment of other wastes; Chlorine and its compounds	8.2-8.6, 9.1-9.4
Mar 22	PCBs and dioxins: chemistry and sources	9.5-9.7
Mar 24	PCBs and dioxins: toxicology, toxic equivalency factors, Phase I/ Phase II metabolism	9.5-9.7
Mar 29	Endocrine disrupting compounds; Pollution in the pulp and paper industry	
Mar 31	Mercury in the environment; Lead in the environment	10.1-10.3
Apr 5	Arsenic in the environment; Acid mine drainage	10.4-10.5
Apr 7	Catch-up and Review	
Apr 19	Final Exam: whole course, emphasis on material covered since Term Test 2	