

## ENVIRONMENTAL CONTAMINANTS - BIO 365

Instructor: Dr. Greg Colores

Class times: MWF 1:00 – 1:50 Brooks 201

Office: Brooks 185

Office hours: Mon. 3 – 5 and Thurs. 2 – 4 and by appointment.

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Text: Environmental Chemistry, 3rd Edition. Colin Baird and Michael Cann, W.H. Freeman and Company, 2005.

### Course description:

This course will serve to acquaint you with the sources, fates and impacts of environmental contaminants. The course will begin with an overview of the environmental chemistry of the atmospheric, aquatic and terrestrial biosphere components and then delve into problems associated with environmental contamination. Topics will include the biogeochemical processes that occur in both natural and impacted systems, the environmental fate of contaminants and their abiotic/biotic transformations, and strategies for dealing with natural systems perturbations. Additional topics will be expanded upon in the form of case studies and student presentations of timely topics in environmental contaminants.

### Course objectives:

Students should accomplish the following:

- \* Develop an understanding of natural biogeochemical processes.
- \* Gain the ability to assess how natural environments are impacted by humans and the potential remedial steps that can be taken.
- \* Acquire the background knowledge to predict potential fates of chemicals introduced into the environment by understanding the chemical and biological interactions that can occur.
- \* Synthesize information from previous courses and this course to critically evaluate and gain a better understanding of current issues relevant to environmental contamination.

### Grading:

There will be three exams and one cumulative final. Each will be worth 100 points and you may drop the lowest test score or elect not to take the final. Exams may contain short answer questions, calculations, multiple choice, fill-in-the-blank, etc. There will be other assignments, case studies, problem solving and write ups that will constitute a portion of your grade. Finally, class participation is expected. I will keep track of your participatory efforts (asks questions, provides answers, attendance...) and if your final grade is borderline your participation may influence whether your grade is bumped up or not.

Exams and final	300
Presentation	50
<u>Assignments</u>	<u>150</u>
Total	500

**Grading Scale:**

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
93+	90- 92.99	87- 89.99	84- 86.99	80- 83.99	77- 79.99	74- 76.99	70- 73.99	67- 69.99	64- 66.99	60- 63.99	0- 59.99

**University Policies:**

**Students requiring accommodations:**

CMU provides students with disabilities reasonable accommodation to participate in educational programs, activities or services. Students with disabilities requiring accommodation to participate in class activities or meet course requirements should first register with the office of Student Disability Services (Park Library 120, telephone #989-774-3018, TDD #2568), and then contact me as soon as possible.

**Policy on academic integrity:**

In May 2001, the Central Michigan University Academic Senate approved the *Policy on Academic Integrity*, which applies to all university students. Copies are available on the CMU website at <http://academicssenate.cmich.edu/noncurric.htm>, and in the Academic Senate Office in room 108 of Bovee University Center. All academic work is expected to be in compliance with this policy.

**Classroom civility:**

Each CMU student is encouraged to help create an environment during class that promotes learning, dignity, and mutual respect for everyone. Students who speak at inappropriate times, sleep in class, display inattention, take frequent breaks, interrupt the class by coming to class late, engage in loud or distracting behaviors, use cell phone or pagers in class, use inappropriate language, are verbally abusive, display defiance or disrespect to others, or behave aggressively toward others could be asked to leave the class and subjected to disciplinary action under *the Code of Student Rights, Responsibilities and Disciplinary Procedures*.

Additional information on this course is available on the course web page at:

<http://www.cst.cmich.edu/users/colorlgm/Courses/mainpage.htm>

**Lecture outline (keep in mind this is a tentative outline and is subject to change)**

Week	Dates	Topic	Baird chapter(s)
1	1/12, 1/13, 1/14	Introduction to environmental chemistry Review problems	
<b>Section 1: Components of the biosphere</b>			
2	<b>1/19</b> , 1/21, 1/23	<b>No class – MLK</b> Chemistry of natural waters	9
3	1/26, 1/28, <i>1/30</i>	Chemistry of soils <i>Case study: Little Rock Lake</i>	12 (p. 591 – 599) <i>LRL articles</i>
4	<i>2/2</i> , 2/4, 2/6	Atmospheric chemistry	1 - 4
<b>Section 2: Environmental fate of contaminants</b>			
5	2/9, 2/11, 2/13	Partitioning of contaminants – fugacity	
6	2/16, 2/18, <b>2/20</b>	Review; catch up; Contaminant transport <b>Exam I</b>	
7	2/23, 2/25, 2/27	Transformation of chemicals - biotic / abiotic <i>Case study: Atrazine</i>	<i>Atrazine articles</i>
8	3/2, 3/4, 3/6	Catch up/continue	
9	<b>3/9 – 3/13</b>	<b>Spring Break – No class</b>	
<b>Section 3: Pollutant classes, modes of action and toxicity</b>			
10	3/16, 3/18, 3/20	Metals <i>Case study: Dioxins</i>	11
11	3/23, 3/25, <b>3/27</b>	Pesticides, Herbicides <b>Exam II</b>	7
12	3/30, 4/1, 4/3	Hydrocarbons and other organics <i>Student presentations</i>	8
13	4/6, 4/8, 4/10	Atmospheric pollutants <i>Case study: Glyphosate</i> <i>Student presentations</i>	2  <i>Relyea articles</i>
<b>Section 4: Contaminant removal</b>			
14	4/13, 4/15, 4/17	Purification of polluted waters <i>Student presentations</i>	10
15	4/20, 4/22, 4/24	Waste, soils and sediment <i>Case Study: As cycling in Yellowstone National Park and the Madison River drainage</i>	12
16	4/27, <b>4/29</b> , 5/1	Final review <b>Exam III</b> <b>No class</b>	
17	<b>Wed. 5/6</b>	<b>Final exam Brooks 201 12:00 – 1:50</b>	