

**Science of Contemporary Issues**  
**NATS 1213**  
**Spring 2004**

**Instructor:** Dr. Verl Murugaverl  
Department of Chemistry and Biochemistry, Olin 205 A.  
303 871 2941, bmurugav@du.edu

**Lectures:** M, W, F 11:00 to 11:50 in Olin 205

**Subject:** *Basic concepts of Environmental toxicology and Chemistry*

**Course Description:**

This course is designed to introduce students to **basic principles of toxicology** and their applications in understanding xenobiotics induced toxicity. Basic principles of chemical bonding, shapes of molecules and functional groups will be reviewed in the initial lectures to provide a foundation for the remainder of the course. Following this, background in basic toxicological concepts such as dose response, entry, mode of action, and metabolism of xenobiotics will be covered. The remainder of the course will introduce the students to specific environmental problems.

**Lecture Text:**

There is no single textbook currently available that adequately matches content of this course. Material covered in this course can be found in a variety of textbooks and web sites relating to toxicology, biochemistry and environmental chemistry. Topics covered in the lecture will be made available on the blackboard on short-term basis.

**Assignments:**

Periodically, problems related to the lecture material will be assigned. These problems will require some additional reading (Library) on your part. You are responsible for completing the assignments and turning in on time. No late assignments will be accepted and will be given a zero grade. Your comprehension will be tested via the exams.

**Exams:**

- a) There will be two one-hour exams and a final exam. There will not be any make up exams under any circumstances and your final grade for the course will be determined by your performance in all the three exams. If your score in the final exam is higher than any of the scores in the one-hour exams, the final exam score will replace the lowest score.
- b) If anyone for any reason had to take the exam out side of the scheduled time, arrangements need to be made with the instructor at least one week advance. The instructor reserves the right to deny or accept the request and also to alter the exam. Often these non-scheduled exams are much harder than the regularly scheduled exams.
- c) **All exams will be comprehensive encompassing; lecture materials, assignments, and laboratory material.**

**Grading:** The break down of the course grades is as follows:

Assignments	100 pts
Exam 1	200 pts
Exam 2	200 pts
Final Exam	300 pts
Lab.	200 pts
TOTAL	1000 pts

## Tentative Lecture Schedule

	Topic	Assignment
March 22	<b>Introduction</b> , course requirement Environment, good life through chemistry, Politics, and Toxicology terminology	
March 24, 26 March 29 March 31	<b>Fundamental concepts in chemistry:</b> Lewis dot symbols, electronegativity Chemical bonding Molecular shapes, polarity	
April 5 April 7 April 9, 14	Functional groups <b>Pharmacological concepts:</b> Determination of toxicity and Dose-Response Dose-response Plots and relationships	
<b>April 16</b>	<b>Exam 1</b>	
April 19 April 21 April 23 April 26	Application of dose-response curves <b>Mode of Entry into Human Body:</b> Comparison of routes of entry Translocation and Storage of Xenobiotics Concentration Gradient and Cell Membranes Cellular uptake	
April 28 April 30	Enzymes, Receptors, Substrate and Storage of Toxins <b>Metabolism and elimination of xenobiotics:</b> Functional Group Modification and cytochrome P-450	
May 3 May 5	Conjugation, Glutathione Mode of action	
<b>May 7</b>	<b>Exam 2</b>	
May 10, 12	Mode of action	
May 14 May 17 May 19, 21 May 24	<b>Environmental Pollution:</b> Air pollution Sources Photochemical smog Depletion of stratospheric ozone Green house effect	
May 26 May 28	Nutrients and pesticides Water and land pollution	
<b>June 1 (Tuesday)</b>	<b>Final Exam (10:00 to 11:45 a.m.)</b>	

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**Instructor:** Dr. Balasingam (Verl) Murugaverl  
Olin, Room 203  
Phone 303-871-2941

**T.A.'s:** Jeff Caufield and Samuel Shirk

**Mailboxes:** Chemistry Department Office: Olin202, x12436

**Lab Location/Times:**

Section 2	Mon. Afternoon	2:00-5:00 pm	BE 15
Section 3	Tues. Afternoon	2:00-5:00 pm	BE 15
Section 6	Tues. Evening	7:00-10:00 pm	BE 15

You are required to do **EVERY** lab. You must attend the lab section you are registered in. There are **NO MAKE-UP LABS**. If you miss your lab section for any reason, you must make it up in the same week the lab is offered.

- If you cannot make your scheduled lab time you **MUST** get permission from your Teaching Assistant before changing.
- All lab assignments must be finished and handed in to the Teaching Assistant at the end of each laboratory period.
- Your comprehension of the material covered in the labs will be tested via the exams.

**Laboratory classes starts on the week of March 31,2003.**