

BASIC TOXICOLOGY SCHEDULE
FSHN 480/EnvSt 480/VB 549/CS 433
Fall 2007, MWF 1.30 pm, room 131

Aug	22	Jeffery	Introduction
	24		Exposure, Absorption, Distribution
	27		
	29		
	31		
Sept	3	LABOR DAY	
	5	Keck	Principles of Toxicology
	7		
	10	Jeffery	Receptors
	12		
	14	(test)	
	17	Jeffery	Metabolism of Foreign Compounds
	19		
	21		
	24		
Oct	26		
	28		
	1	EXAM I	
	3	Plewa	Genetic Toxicology and Toxicogenomics
	5		
	8		
	10		
	12		
	15		
	17	Wallig	The intoxicated patient
	19		
	22	Jeffery	Excretion
	24		
26	EXAM II		
29	Dirikolu	Pharmacokinetics	
31			
Nov	2		
	5		
	7		
	9		
	12		
	14	(test)	
	16		
	22	THANKSGIVING	
	26		
	28		
	30		
Dec	3		
	5		
	7	EXAM III	

OPTIONAL FINAL
1:30-4:30 PM, Thursday, December 13

BASIC TOXICOLOGY SYLLABUS FALL 2007
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Introduction

Definitions of toxicology, toxic substances, toxicology endpoints, history of toxicology, careers in toxicology, Society of Toxicology (Chapter 1).

Exposure, Absorption and Distribution

Routes of exposure: lungs, skin, GI tract. Characteristics of membranes, passage across membranes, Henderson-Hasselbach. Plasma, extracellular and intracellular compartments; uneven distribution of toxic substances, storage of toxic substances in bone and fat (Chapter 3).

Principles of Toxic Action

Dose-Response and Frequency plots, cumulative response, probits, LD₅₀, efficacy and potency (Chapter 2).

Receptors

Molecular site of action of toxic compounds: receptors, agonists and antagonists, mechanisms of toxicity (Chapter 2; 5).

Metabolism

Phase I/Phase II; P₄₅₀ mechanism, variety of P₄₅₀'s, glucuronidation, sulfation, GSH conjugation. Bioactivation and detoxification, benzopyrene, bromobenzene, acetyl aminofluorene and acetaminophen metabolism. Induction and inhibition (Chapters 4 and 5).

Excretion

Kidney function, filtration, reabsorption, secretion of xenobiotics. Measurement of excretion, competition for excretion, inhibition of excretion. Metals disposition and excretion (Chapter 3).

Clinical Toxicology

Principles of managing the poisoned patient; the toxicity of common poisons in humans; and the use of animals in toxicology. Common clinical methods that are used to manage poisoned patients. Toxic effects of chemicals that lead to clinical toxicity in human patients.

Genetic Toxicology and Toxicogenomics

Mutagenesis and carcinogenesis; the Ames test. Genotoxins and epigenetic carcinogens. Oncogens. Environmental mutagens (Chapter 6; 7).

Pharmacokinetics

To discuss principles of drug biotransformation and excretion, identify drug factors that determine biotransformation and excretion, explain the "first-pass" effect and bioavailability, discuss common routes of drug excretion, define terminology used in pharmacokinetics, relate half-life, volume of distribution and systemic clearance to clinical use of drugs, dosage design and drug withdrawal times, define loading and maintenance doses, review patient and disease factors that influence pharmacokinetics and clinical response

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The course is arranged with 5 exams worth 80% of the grade, a term paper worth 15% of the grade and 5% for class participation.

TEXT: Optional; Principles of Biochemical Toxicology by Timbrell.

HOURLY EXAMS: Worth **75 points** Exams 1-4 are hourly exams and are not cumulative. Exam I covers all lectures to that date (Jeffery, Keck). Exam II covers material from Jeffery (metabolism), Exam III is Jeffery, Wallig and Plewa. Exams IV and V are Dirikolu.

EXAM I Jeffery **28 points**, Keck **4 points**
October 1

EXAM II Plewa **12 points**, Wallig **4 points**, Jeffery **4 points**
October 26th

EXAM III Dirikolu **30 points**
December 7th

Paper Due **15 points**
November 16th

Participation emails due **5 points**
December 7th

FINAL EXAM: This exam will be offered at 1.30 pm on December 13th. This is an optional cumulative 3-hour exam (1:30-4:30). If students feel they did not do themselves justice on earlier work, they may take this. It is worth 100 points, which will be calculated as half the grade: If they have a grade of 70/100 for all other parts and get a grade of 90/100 for the optional final, then their score will be $(70+90)/2=80\%$.

PAPER: Worth **15 points**, due November 16th, sent electronically to ejeffery@uiuc.edu. The student should write a 5-page double-space paper on toxicity of a compound that has been in the news at some point during the semester, addressing the topic from the perspective of what they have learned in class. For example, a pesticide spill could be discussed from the perspective of known toxic effects, but also the size of the spill and how humans absorb it, and thus whether there should be concern and/or how an exposed person should be treated. Or maybe a toxic something in some food – but not a microbiological problem. Please discuss the topic with your instructor. The paper should have a minimum of 5 references to **peer-reviewed** scientific papers (URLs not accepted), plus a reference to the news story. If it is 24 h late, it will be graded out of 10 points; if it is 48 h late it will be graded out 5 points; there will be no grade for papers handed in more than 48 h late.

PARTICIPATION: Worth **5 points**. Students are expected to ask a minimum of 3 questions DURING CLASS during the semester. Students should e-mail Dr. Elizabeth Jeffery (ejeffery@uiuc.edu) with the Q & A from 3 questions by December 7th, to receive this grade (one email with all 3 questions, showing the dates they were asked and the instructor's response to show you understood and learned from the question).

MISSED CLASS/RE-SCHEDULED EXAMS: Students must make requests for changes to Dr. Jeffery by e-mail for any exam date conflict a minimum of 1 week prior to the change OR have a written note from McKinley or equivalent.