

**Introduction to Superfund Sites and Health Effects of Hazardous Waste
PHRM 657/ENVS 657 (Co-Listing BGS and SAS)**

Course Directors: Dr. Jane Willenbring – Assistant Professor Earth and Environmental Sciences
 Dr. Richard Pepino – Lecturer, Earth and Environmental Sciences and Pharmacology
 Dr. Trevor Penning – Professor of Pharmacology, Biochemistry & Biophysics and OB/GYN

Lectures Days/Times: 4:00 – 5:00 pm Monday (Lecture Only)
 4:00 – 5:30 pm Wednesday (Lecture and student Assignment)

Location: 1101 BRB II/III

DATE	Lecture No	Student Assignment	PHRM 657/ENVS 657 - FALL 2014 Topic	Lecturer
WED, SEP 03			Introduction to Course: Overview, Expectations, & Logistics	<i>Course Directors</i>
MON, SEP 08	1		Superfund (CERCLA) Enabling Legislation Palmerton Case Study	Pepino
WED, SEP 10	2	Lecture 1	The Superfund Process: Ranking, Removal & Remediation of National Priority Listed Sites	Pepino
MON, SEP 15	3		Risk Assessment: Hazard Identification	Penning
WED, SEP 17	4	Lecture 2-3	Risk Assessment: Hazard Characterization	Penning
MON, SEP 22	5		Student Assignments	<i>Course Directors</i>
WED, SEP 24	6	Lecture 4-5	Risk Assessment: Risk Management	Pepino
MON, SEP 29	7	Lecture 6	Risk Assessment: Risk Communication	Howarth
WED, OCT 01	Field Trip	2:30-7:30pm	The BoRit (Asbestos) Superfund Site-Field Visit & Community Meeting	Pepino
MON, OCT 06	8		Remediation Strategies	Willenbring
WED, OCT 08	9	Lecture 7-8	Effects of Hazardous Waste on the Ecosystem & Effects of the Ecosystem on Hazardous Waste	Casper
MON, OCT 13	10		Contamination of Ground & Surface Water	Jerolmack
WED, OCT 15	11	Lecture 9-10	Environmental Justice EO-12898: Application to Vulnerable Populations	Beers**
MON, OCT 20	Field Trip	10:00–2:00pm	The Palmerton, PA (HEAVY METAL) SRP Site-Field Visit & Community Reaction to clean-up process	Pepino
WED, OCT 22	12	Lecture 11-12	Dealing with Mixtures	Penning
MON, OCT 27	13		Monitoring for Air Toxic Environmental (External) Exposures (Environmental Engineer, Philadelphia Air Monitoring Laboratories)	Hallie Weiss
WED, OCT 29	14	Lecture 13-14	Bio-monitoring-Internal Dose	Blair
MON, NOV 03	15		Exposome Concepts	Blair
WED, NOV 05	16	Lecture 15-16	Health Effects of Major SF-Contaminants-Heavy Metals-I	Liu
MON, NOV 10	17		The National Toxicology Program	Penning
WED, NOV 12	18	Lecture 17	Health Effects of Major SF-Contaminants-Heavy Metals-II	Osterhoudt
MON, NOV 17	19		Health Effects of Major SF-Contaminants-Asbestos	Vachani
WED, NOV 19	20	Lecture 18-19	Health Effects of Major SF-Contaminants-PAH	Penning
MON, NOV 24	21		Health Effects of Major SF-Contaminants-Persistent Organic Chemicals (PCBs and Halogenated-PAH)	Penning
Wed, Nov 26			No Class	THANKSGIVING
MON, DEC 01	22		Computational Data Bases TOXNET	Penning
WED, DEC 03	23	Lecture 20-21	TOX 21 st Century	Price
WED, DEC 10	24		Student Presentation on Analysis of Selected Superfund Site	<i>Course Directors</i>

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INTRODUCTION FOR PHRM 657/ENVS 657: This course will become a key-component of a new Interdisciplinary Superfund Research Training Program involving graduate students in SAS (earth and environmental sciences and biology), graduate students in BGS (Certificate Program in Environmental Health Sciences) that is funded by the Penn Superfund Research & Training Program Center Grant P42-ES023720.

COURSE OBJECTIVES: Superfund hazardous waste sites are prevalent in our nation and the exposures to toxicants from these sites raises, immediate public health concerns. The aims of this course are to educate students about these sites and provide a scientific basis for hazard identification, hazard characterization, risk communication and risk management. The course will describe the effect of these hazardous chemicals on the ecosystem and vice-versa and remediation and mitigation approaches. These environmental science issues will lead into the environmental health aspects of exposures including: biomonitoring (external and internal dose, biomarkers and the exposome), toxicological properties of contaminants and mode-of-action. The course will be complemented with visits to two Superfund sites in the region: Ambler (Asbestos) and Palmerton (Heavy Metals).

*Mr. Richard Pepino has over 25 years of experience in regulatory science and was a former member of EPA region III.

**Ms. Samantha Beers, Director US EPA Region III Office of Enforcement, Compliance and Environmental Justice.

Course Grading: 30% Lecture Assignments
30% Written Hazard Report on Superfund Site
30% Oral Presentation on Selected Superfund Sites
10% Class participation

ELIGIBLE STUDENTS: Any PhD student in SAS, BGS, MES or MPH student with permission of the course director. Pre-requisites would include 400 level course in Biology/Chemistry and Biochemistry.

CONTACT INFORMATION	
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