

Room and Time: TBA**Instructor:** Dr. Curt Eckhert (CHS 76-080) **Office hours:** Thursdays 3 -5, after class or by appointment.**TAs:** None**Website:** <http://www.ph.ucla.edu/ehs/ehs280/index.htm> **Prerequisites:** Preparation in biological and chemistry necessary to understand basic concepts underlying health and disease and ecology.

The goal of this course is to provide students with sufficient knowledge so they can read, with understanding, articles related to sources of nanomaterials their properties, use, toxicity and life cycle and interaction with biology. Topics include their manufacture, physiochemical properties, potential sources of pollution, fate and transport in the environment, impact on biological cells and organisms, and populations and stability of ecosystems and tools used to assess and reduce biological harm. Students will become familiar with how this knowledge is developed and new approaches to assess their risk to human and ecological health.

Course Outline	
Lecture	Topics
	Toxicity and Ecotoxicity
1	Lessons for Nanomaterial Safety from Chemical Toxicity
2	Approaches for Assessing, Preventing and Controlling Environmental Hazards: Surveillance; Barriers (Physical, Behavioral & Legal); Green Chemistry
3	Principles of Toxicology: Toxicokinetics (absorption; distribution, excretion & body burden)
4	Principles of Toxicology: Biotransformations of Chemicals (P450 system; conjugation)
5	Principles of Toxicology: Toxicodynamics: Molecular, Cellular and Organ System Toxicity
6	Ambient Nanoparticles and Human Health
7	Nanomaterial Libraries and Toxicity databases
	Nanomaterial Sources and Characterization
8	Physical and Chemical Properties of Nanomaterials
9	Natural Nanomaterials and Nanobiogenochemistry
10	Nanoparticle Formation & Manufacture
11	Estimating Emission of Nanomaterial
12	Methods and Instrumentation for Detection of Nanoparticles
	Fate and Transport of Nanomaterials in Environmental Media
13	Colloidal Properties of Nanoparticles
14	Interaction of Nanomaterials with the Inorganic Environment
15	Environmental Transformation and aging of Nanomaterials
16	Environmental Transport of Nanomaterials
	Nanomaterial Biology Interface
16	Nano-Bio Particles: Cellular Uptake Mechanisms
17	Cellular Oxidative Stress
18	Genotoxins and Genetic Instability
19	Biotransformation of Nanomaterials
20	Impact of Nanomaterials on Microorganisms
21	Impact of Nanomaterials on Organisms and Ecosystems
	Assessment of Risk to Human and Ecological Health
22	Life Cycle Analysis: An Approach to Assess Impact on Environmental Sustainability
23	WHO, EPA and European Union Risk Assessment Models
24	High Throughput Screening: An Approach to Replace Traditional Toxicology Animal Tests
25	Systems Analysis as an Approach to Model Environmental Implications of Nanotechnology
	Midterm and Final Exams TBA