



## Introduction to Environmental Health (EHS 100) Fall 2015

**Instructor:** Dr. Tom Hatfield (CHS 51-297)  
[tom.hatfield@csun.edu](mailto:tom.hatfield@csun.edu)  
Office hours: TTh noon-1

**Lectures:** TTh 1:00-3:00 pm  
CHS 43-105A

**Readers:** Olivia Ellis: [microlabrat@aol.com](mailto:microlabrat@aol.com)  
Bryan Moy: [bryanwmoy@gmail.com](mailto:bryanwmoy@gmail.com)

**Moodle:** <https://ccle.ucla.edu/enrol/index.php?id=28869>

**Prerequisites:** This course is primarily for MPH students.

**Overview:** Environmental Health is concerned with the biological, chemical, and physical influences on human health. This course introduces major terms and concepts used in environmental health practice, focusing on environmental exposures, resulting health effects, and appropriate controls for these hazards. We discuss basic tools for addressing a variety of current problems on the micro, regional, national, and global scale. The major application areas are: food safety, pests and pesticides, air quality, global climate change, the built environment, water quality, wastewater, solid and hazardous wastes, industrial hygiene, and radiation.

**Learning Objectives:** Upon completion of this course, students should understand basic terms, core concepts, and fundamental skills used by environmental health practitioners. With this understanding, students should be able to access the literature (including reputable online sources) in order to:

1. Given a specific environmental agent, use data sources to develop a concise summary of the agent's sources, basic attributes, and fate.
2. Identify adverse effects of environmental agents on human health (both acute and chronic), on ecosystems, and on other risks (including economic and psychological), which requires an awareness of susceptibility, toxicity, and methods of risk analysis.
3. Recommend systematic controls of environmental health hazards, demonstrating an awareness of state and federal regulatory programs.
4. Develop a testable model of environmental insults as a means of improving forensic skills for assessing, preventing, and controlling hazards.
5. Accurately and effectively communicate environmental health risks to targeted stakeholders and explain why/whether some populations are at greater risk than others for specific agents.
6. Describe an example of how regulations and/or inspections have been used to prevent environmental health problems; describe who has the authority to impose these regulations in our region.

### Grading:

1. Two non-cumulative exams and a final cumulative exam, each worth up to 50 points (note: no make-up exams).
2. Two online written assignments worth a total of 50 points. Further guidelines will be given on the class website. We will deduct two points per day for submissions after the due date.
  - a. Review of a journal article (20 points)
  - b. Develop a testable hypothesis (30 points)

**Text:** No required textbook, but there will be online reading assigned on our Moodle page.

**Other Material:** Be sure to consult the course Moodle Page on at least a weekly basis!

If you wish to request an accommodation due to a disability, please contact the Office for Students with Disabilities as soon as possible at A255 Murphy Hall, (310) 825-1501, (310) 206-6083 (telephone device for the deaf). Website: [www.osd.ucla.edu](http://www.osd.ucla.edu).

# INTRODUCTION TO ENVIRONMENTAL HEALTH (EHS 100)

## Scheduled Lectures

Date	Topics (numbered by week)	Assignments (in bold black), Readings (in red), web sites for review (in blue)
Sept. 24	1. Tools of EH (definitions) (ppt 1-10)	<b>1. Defining Environmental Health</b> 2. Receive email updates: <a href="#">EPA</a> ; <a href="#">Intro to RA</a> 3. Receive email updates: <a href="#">CA EPA</a> 4. Receive email updates: <a href="#">CDC</a> 5. <a href="#">PubMed</a> 6. <a href="#">CDC's Environmental Public Health Tracking Network</a> 7. <a href="#">Environmental Health Perspectives</a> 8. <a href="#">EPA green apps</a> 9. <a href="#">Laws and Regs of the California EPA</a> 10. Search <a href="#">CDC</a>
Sept. 29 <b>(Tues.)</b>	Tools of EH (law) (ppt 11-16)	<b>11. Free legal research resources</b> 12. <a href="#">California Health and Safety Code</a> 13. <a href="#">California Law</a> (Statutes) 14. <a href="#">California Code of Regulations</a> 15. <a href="#">U.S. Statutes at Large</a> 16. <a href="#">United States Code</a> 17. <a href="#">Federal Register</a> 18. <a href="#">Code of Federal Regulations</a>
Oct. 1	3. Tools of EH (microbiology) (ppt 17-20)	<b>19. CDC: Diseases and Conditions</b> 20. <a href="#">CDPH: Diseases and Conditions</a> 21. <a href="#">J of Emerging Infectious Diseases</a> 22. <a href="#">GAO Reports</a>
Oct. 6 <b>(Tues.)</b>	Tools of EH (risk analysis) (ppt 21-33)	23. <a href="#">Toxline</a> 24. <a href="#">ToxNet</a> 25. <a href="#">Integrated Risk Information System</a> 26. <a href="#">Hazardous Substances Data Bank</a> 27. <a href="#">Office of Environmental Health Hazard Assessment</a> 28. <a href="#">ChemIDPlus</a> 29. <a href="#">National Toxicology Program Report on Carcinogens</a>
Oct. 8	3. Food Safety (ppt 34-48)	<b>30. Foodborne illnesses</b> 31. Email updates <a href="#">FDA</a> 32. <a href="#">FDA videos</a> 33. <a href="#">FDA Recalls, Outbreaks, and Emergencies</a> 34. <a href="#">Bad Bug Book</a> 35. <a href="#">Federal Food, Drug, and Cosmetic Act</a> 36. <a href="#">Food Safety Modernization Act</a> 37. <a href="#">LA County grading system</a> 38. <a href="#">California Health and Safety Code</a> 39. Search <a href="#">FDA</a>

Oct. 13 <b>(Tues.)</b>	Vectors (ppt 49-60)	<b>Paper 1 Due</b> 40. <a href="#">FIFRA</a> 41. <a href="#">ToSCA</a> 42. <a href="#">Endocrine Disruptors, Endocrine Primer</a> 43. <a href="#">VectorBase</a> 44. <a href="#">Department of Pesticide Regulation</a> 45. <a href="#">U.S. Government Manual</a> 46. <a href="#">REHS Program</a> 47. <a href="#">Search California EPA</a>
Oct. 15	4. Pesticides (ppt 61-71)	
Oct. 20 <b>(Tues.)</b>		<b>EXAM 1</b>
Oct. 22	5. Solid Wastes (ppt 72-80)	
Oct. 27 <b>(Tues.)</b>	Hazardous Wastes (ppt 81-88)	48. <a href="#">RCRA</a> 49. <a href="#">CERCLA</a> 50. <a href="#">SARA</a> 51. <a href="#">EPA Toxic Release Inventory</a> 52. <a href="#">CalRecycle</a> 53. <a href="#">Household Products Database</a> 54. <a href="#">Department of Toxic Substances Control</a>
Oct. 29	6. Built environment (ppt 89-103)	55. <a href="#">EPA: Our Built Environment</a> 56. <a href="http://www.countyhealthrankings.org/#app/">http://www.countyhealthrankings.org/#app/</a> 57. <a href="http://www.kidsdata.org">http://www.kidsdata.org</a> 58. <a href="http://www.cdc.gov/obesity/data/adult.html/">http://www.cdc.gov/obesity/data/adult.html/</a> 59. <a href="#">Public Health Advocacy</a> 60. <a href="http://nhts.ornl.gov/2009/pub/stt.pdf">http://nhts.ornl.gov/2009/pub/stt.pdf</a> 61. <a href="#">Nation's Health (Newsletter)</a>
Nov. 3 <b>(Tues.)</b>	Water Quality (ppt 104-114)	62. <a href="#">Groundwater recharge</a> 63. <a href="#">SDWA</a> 64. <a href="#">State Water Resources Control Board</a> 65. <a href="#">L.A. Regional Water Quality Control Board</a> 66. <a href="#">Drinking Water Data &amp; Databases</a> 67. <a href="#">Center for Environmental Health</a> 68. <a href="#">Public Health Career Mart</a> 69. Search <a href="#">CDPH</a>
Nov. 5	7. Wastewater (ppt 115-122)	
Nov. 10 <b>(Tues.)</b>	Wastewater (ppt 123-136)	<b>Paper 2 Due</b> 70. <a href="#">Clean Water Act</a> 71. <a href="#">National Pollutant Discharge Elimination System</a> 72. <a href="#">Water recycling and reuse</a> 73. <a href="#">Evolving topics</a> 74. <a href="#">Primer for Municipal Wastewater Treatment Systems</a> 75. <a href="#">Advocacy for Public Health</a> 76. <a href="#">Topics and Issues</a>

Nov. 12	8. Air Quality (ppt 137-147)	77. <a href="#">Clean Air Act</a> 78. <a href="#">Cal-EPA Air Quality</a> 79. <a href="#">California Air Resources Board</a> 80. <a href="#">South Coast AQMD</a> 81. Receive email updates <a href="#">air quality</a> 82. Receive email updates <a href="#">u.v. index</a> 83. <a href="#">Air Quality, Los Angeles</a> 84. Search <a href="#">EPA</a>
Nov. 17 <b>(Tues.)</b>		<b>EXAM 2</b>
Nov. 19	9. Air Quality (ppt 148-159)	
Nov. 24 <b>(Tues.)</b>	Global climate change (ppt 160-168)	
Nov. 26	<b>Thanksgiving Break</b>	
Dec. 1 <b>(Tues.)</b>	10. Industrial Hygiene (ppt 169-181)	85. <a href="#">American Industrial Hygiene Association</a> 86. <a href="#">American Conference of Government Industrial Hygienists</a> 87. <a href="#">American Board of Industrial Hygiene</a> 88. <a href="#">Occupational Safety and Health Administration</a> 89. <a href="#">NIOSH Chemical Safety and Databases</a>
Dec. 3:	Radiation (ppt 182-197)	90. <a href="#">Radiation Health Impacts</a> 91. <a href="#">Nuclear Regulatory Commission</a> 92. <a href="#">Environmental Protection Agency</a> 93. <a href="#">Dept. of Energy</a> 94. <a href="#">Dept. of Transportation</a> 95. <a href="#">Dept. of Interior</a> 96. <a href="#">OSHA</a> 97. <a href="#">FDA</a> 98. <a href="#">NCRP</a> 99. <a href="#">ICRP</a> 100. <a href="#">California Radiation Control Law</a>
Dec. 8 <b>(Tues.)</b>	<b>(finals week)</b>	<b>EXAM 3</b>

## **TERMS AND CONCEPTS -- Exam #1**

### **TOOLS OF ENVIRONMENTAL HEALTH**

#### **Initial definitions:**

1. environmental health
2. public health
3. health
4. environment
5. interrogatives
6. risk, hazard
7. type 3 statistical error
8. geographic information systems (GIS)
9. sustainability
10. carcinogen, mutagen, teratogen

#### **Environmental law**

11. rights, duties
12. *stare decisis*
13. constitutional
14. statutory
15. administrative
16. common
17. malfeasance, misfeasance, nonfeasance
18. police power
19. nuisance
20. eminent domain
21. embargo
22. subpoena
23. due process
24. equal protection
25. exclusionary rule
26. litigation, arbitration, negotiation

#### **Microbiology:**

27. communicable disease
28. epidemiologic triangle: agent, reservoir, host
29. pathogenicity, virulence
30. incubation period
31. carrier: asymptomatic, incubatory, convalescing
32. transmission: direct, indirect
33. vehicle borne: fomite
34. food, water: coliforms, enteric, helminthic
35. vector-borne, infestation

#### **Risk analysis**

36. epidemiology
37. toxicology
38. prevalence
39. incidence
40. synergism
41. potentiation
42. antagonism
43. risk assessment
44. hazard identification
45. weight of evidence
46. dose-response assessment, LD-50

47. exposure assessment, exposure
48. risk characterization
49. risk communication
50. source – message –channel -- receiver
51. risk perceptions, outrage factors
52. risk management

### **FOOD SAFETY**

53. food related illness
54. intoxication
55. infection
56. chemical poisoning
57. CDC top risk factors for food
58. gastroenteritis
59. sterilize
60. disinfect
61. sanitize
62. spoilage organisms
63. exotoxin
64. endotoxin
65. enterotoxin
66. neurotoxin
67. pasteurization
68. ultra-pasteurization
69. thermometers
70. thermoduric
71. thermophilic
72. mesophilic
73. psychrophilic, cryophilic

### **VECTORS**

74. mechanical vectors
75. biological vectors
76. rodents
77. *Rattus norvegicus*
78. *Rattus rattus*
79. *Mus musculus*
80. arthropods: insects, arachnids
81. cockroaches: American, Oriental
82. German, Brown-banded
83. lice: *Pediculus humanus*
84. *Pediculus capitis*
85. *Pthirus pubis*
86. fleas
87. *Ctenocephalides*
88. *Xenopsylla cheopis*
89. Flies: *Musca domestica*
90. mosquitoes: Anopheles, Culex, Aedes

## **PESTICIDES**

91. Insecticides, Inorganics: boric acid, silica gel
92. Botanicals:
93. Pyrethrum (pyrethroids)
94. Rotenone (rotenoids)
95. Nicotine, neo-nicotinoids
96. Chlorinated hydrocarbons: DDT
97. Organophosphates: parathion, malathion
98. Carbamates: baygon, aldicarb
99. Rodenticides: bait shyness
100. Anticoagulants: warfarin
101. Quick kill: strychnine, 1080, 1081
102. Botanicals: red squill
103. Selective: Norbromide
104. Pesticide Labels (signal words):
105. Danger
106. Warning
107. Caution
108. Integrated pest management:
109. *Gambusia affinis*
110. autocide
111. pheromones
112. juvenile hormones
113. antifeedants
114. FIFRA, ToSCA

## **TERMS AND CONCEPTS – Exam #2**

### **SOLID AND HAZARDOUS WASTES**

115. garbage, rubbish
116. resource recovery:
117. reuse
118. reclamation
119. recycling
120. source reduction
121. sanitary landfill:
122. leachate
123. incineration
124. hazardous wastes
125. ignitibility, reactivity
126. corrosivity, toxicity
127. hazardous waste manifest
128. neutralization
129. precipitation
130. distillation
131. RCRA, CERCLA
132. SARA: ATSDR, TPQ, EPCRA, TRI

### **BUILT ENVIRONMENT**

133. Sprawl,
134. Connectivity
135. Curb cuts, Pedestrian friendly, Bicycle friendly
136. Mixed use development
137. Brownfields
138. Permeability,
139. Low-impact development
140. Health Impact Assessment

## **DRINKING WATER**

141. Percolation, leaching
142. Groundwater, aquifer
143. zone of aeration, zone of saturation
144. porosity
145. water table
146. surface water
147. eutrophication
148. epilimnion
149. metalimnion
150. hypolimnion
151. thermocline
152. turbidity
153. water treatment
154. coagulation, flocculation
155. sedimentation
156. reverse osmosis
157. ion exchange
158. filtration, slow sand filter
159. chlorination
160. free residual chlorine
161. hypochlorous acid
162. hypochlorite ion

## **WASTEWATER**

163. assimilative capacity
164. total solids
165. settleable solids
166. BOD, COD, TOD, TOC
167. Municipal wastewater treatment
168. preliminary treatment
169. bar screen, grit chamber
170. comminuter
171. primary treatment
172. sedimentation
173. secondary treatment
174. activated sludge
175. trickling filters
176. rotating biological contactor
177. tertiary treatment
178. sludge digestion
179. waste stabilization ponds
180. Individual wastewater treatment
181. septic tanks
182. perc test
183. pit privy
184. retention containers
185. leaching pits
186. black water
187. gray water

## **AIR POLLUTION**

188. content of clean dry air
189. criteria air pollutants
190. SO<sub>x</sub>, NO<sub>x</sub>, particulates, CO, lead, ozone
191. photochemical smog
192. particulates:
193. dust
194. smoke

- 195. fumes
- 196. mist
- 197. spray
- 198. PM-10, PM-2.5
- 199. UFP, nanomaterials
- 200. hydrocarbons:
- 201. VOC, PAH
- 202. respiratory regions:
- 203. nasopharyngeal
- 204. trachobronchial
- 205. respiratory bronchioles and alveoli
- 206. cilia, macrophage
- 207. absorption, adsorption
- 208. chronic obstructive pulmonary disease
- 209. asphyxiant
- 210. urban heat island
- 211. acid rain
- 212. Clean Air Act:
- 213. best practicable technology
- 214. pollutant standards index
- 215. attainment area
- 216. non-attainment area
- 217. prevention of significant deterioration
- 218. NAAQS
- 219. NESHAPS
- 220. Global warming
- 221. conduction, convection, radiation
- 222. albedo
- 223. atmosphere
- 224. troposphere
- 225. stratosphere
- 226. stratospheric ozone depletion
- 227. CFCs
- 228. destructive radicals
- 229. stabilizing reactions
- 230. indoor air quality

### **TERMS AND CONCEPTS -- Exam #3**

#### **INDUSTRIAL HYGIENE**

- 231. Industrial Hygiene
- 232. Hierarchy of controls:
- 233. engineering,
- 234. administrative
- 235. housekeeping,
- 236. PPE
- 237. OSHA (PEL, BEI, AL)
- 238. NIOSH (REL)
- 239. ACGIH (TLV)
- 240. Exposure values: ceiling, peak, STEL, TWA

- 241. incident, breathing zone, danger zone
- 242. Sensitizer
- 243. MSDS, General duty clause

#### **RADIATION**

- 244. ionizing radiation, ion
- 245. radioisotope
- 246. free radical
- 247. directly ionizing radiation
- 248. alpha particles
- 249. beta particles
- 250. other charged particles
- 251. indirectly ionizing radiation
- 252. gamma
- 253. X-ray
- 254. neutrons
- 255. measures (traditional, SI)
- 256. Curie,
- 257. Becquerel
- 258. Roentgen,
- 259. Exposure unit
- 260. RAD,
- 261. Gray
- 262. REM,
- 263. Seivert
- 264. LET,
- 265. RBE, QF
- 266. sources of radiation
- 267. natural (terrestrial, cosmic), artificial
- 268. radioactive half-life
- 269. biological half-life
- 270. effective half-life
- 271. factors affecting sensitivity
- 272. mitotic activity
- 273. differentiation
- 274. radiosensitizers
- 275. sulfhydryl groups
- 276. jurisdiction: NRC, EPA, DOE, etc.
- 277. effects (acute, chronic)
- 278. somatic, genetic
- 279. inverse square law
- 280. half value layer
- 281. radon
- 282. non-ionizing radiation
- 283. ultraviolet (UV)
- 284. visible
- 285. infrared (IR)
- 286. microwaves
- 287. ELF electromagnetic fie