SYLLABUS
Environmental and Occupational Health EHS 575
Spring 2020

Time: Thursday, 4-6:50 PM
Location: Drachman Hall, Room A118

Instructor/Course Coordinator: Kelly A. Reynolds, Ph.D.
MEZCOPH/CEP
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Email: reynolds@email.arizona.edu

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Guest Lecturers
Mona Arora, MSPH U of A MEZCOPH
Will Humble, MPH, UAHS Center for Population Science & Discovery
Jeff Sandstrom Radiation Control, U of A

Dr. Reynolds’ Office Hours: by appointment. The best way to get in touch with me is via email. Please allow up to 48 hours response time.

Teaching Assistant: Amy Nematollahi, amilajo@email.arizona.edu

TA Office Hours: by appointment.

Catalog/Course Description: Course emphasizes health hazard sources, methods to identify & evaluate them, and framework used to affect hazard control. Students will evaluate public health issues, understand research designs, identify and evaluate factors important to the development of monitoring programs.

Course Prerequisites: Recommended background reading in Epidemiology and Biostatistics. Need Epi Background? Read Chapter 4

Course Objectives and Expected Learning Outcomes: During this course, students will:

1. Specify approaches for assessing, preventing and controlling environmental hazards that pose risks to human health and safety.
2. Describe the direct and indirect human, ecological and safety effects of major environmental and occupational agents.
4. Describe genetic, physiologic and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards.
5. Discuss various risk management and risk communication approaches in relation to issues of environmental justice and equity.
6. Explain the general mechanisms of toxicity following various environmental exposures.
7. Develop a testable model of environmental insult.
8. Describe federal and state regulatory programs, guidelines and authorities that control environmental health issues.

Learning Outcomes (Competencies Obtained): Upon completion of this course students will be able to:

Program Competencies Covered (MPH Program level):
1. Apply epidemiological methods to the breadth of settings and situations in public health practice
   - Student reflections are assessed on their use of quantifying exposures.
2. Select quantitative and qualitative data collection methods appropriate for a given public health context
   - Students are assessed on how they select data to determine workplace contaminants through in class exercises and reflections.
4. Interpret results of data analysis for public health research, policy or practice
   - Students are assessed on how they interpret exposure data from reflections and final project presentations.
8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs
   - Student exams and reflections are assessed how they address issues related to environmental justice, and the cumulative effect of environmental hazards in vulnerable populations.
10. Explain basic principles and tools of budget and resource management
    - Students are assessed on how they understand resource management tools from reflections and in class assignments.
12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence
    - Students reflections are assessed on how history and policies related to environmental health.
13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes
    - Students homework is assessed on how the strategies used to identify stakeholders regarding workplace contaminants.
16. Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making
    - Student assignments are assessed on how they communicate the risk-risk tradeoffs and their reflections on leadership and team investigations.
20. Describe the importance of cultural competence in communicating public health content
    - Students are evaluated on how incorporate cultural competence in reflections on environmental justice and team investigations.
22. Apply systems thinking tools to a public health issue
    - Students’ reflections are assessed on systems thinking and the paradox of sustainability.

Concentration Competencies Covered (MPH):
3. Identify control methods for reducing worker or public exposures to acceptable levels.
   - An initial assignment is assessed on students to identify control methods for workplace contaminants, exposure and health. A reflection within the Occupational and environmental health module is used to assess how students identify Work, Health, and Well-Being & Injuries; as well as a reflection on Prevention within the same module)
4. Describe factors which influence the behavior of aerosols and their ultimate fate including deposition in the respiratory system.

_Students are assessed using a quiz on Air Pollution & Buildings and Health within the same named module._

**Course Notes:** You are expected to take your own notes in class. Computers, phones, pads and other electronic devise may only be used during class lecture time for class related activities. We may use computers for class specific activities. Class lecture material will be posted on D2L following the class. Some instructors may post additional content or distribute printed material in class at their discretion. These materials will be posted on the D2L site under the appropriate lecture.

**Text/Readings:** *Environmental Health: From Global to Local*, 3rd Edition (2016) by Howard Frumkin (Editor). Additional material may be posted on D2L. A physical copy of the 3rd edition can be purchased from the medical bookstore or online retailers. An online electronic version is available through the University library. Make sure you have the 3rd edition, as chapter numbers and pages will differ between editions.

**Course Requirements:** You are expected to read the assigned chapters before class, respond to questions in class, submit homework and assignments on time, take exams on the specified dates, coordinate research and presentation tasks with your assigned group and successfully complete any work given during scheduled classes. Changes and other information about the class will be mailed to your University of Arizona e-mail address through D2L. It is your responsibility to forward or check this e-mail.

The point allocation/grading scheme follows:

<table>
<thead>
<tr>
<th>Task</th>
<th>Potential Points</th>
<th>Grades Awarded</th>
<th>Accumulated Point Range for Grade</th>
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</thead>
<tbody>
<tr>
<td>Initial Self-Evaluation</td>
<td>25</td>
<td>A</td>
<td>&gt;494</td>
</tr>
<tr>
<td>3 Exams @ 100 points each</td>
<td>300</td>
<td>B</td>
<td>439 to &lt;494</td>
</tr>
<tr>
<td>8/9+ Class reflections @ 8 points*</td>
<td>64</td>
<td>C</td>
<td>384 to &lt;439</td>
</tr>
<tr>
<td>Presentation proposal</td>
<td>25</td>
<td>D</td>
<td>329 to &lt;384</td>
</tr>
<tr>
<td>Presentation outline</td>
<td>25</td>
<td>E</td>
<td>&lt;329</td>
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<tr>
<td>Presentation draft</td>
<td>25</td>
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<tr>
<td>Presentation (oral delivery &amp; questions: 20 points)</td>
<td>60</td>
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<tr>
<td>Wrap-up Self-Evaluation</td>
<td>25</td>
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<tr>
<td><strong>Total points</strong></td>
<td><strong>549</strong></td>
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*lowest scores beyond 8 reflections will be dropped.

**Due Dates** for assignments are designated on the syllabus. Do not rely on dropbox dates and times. These are sometimes inaccurate. All late assignments will be penalized 10% per day. There is no extra credit for this graduate course. There is no make up for missed in-class reflections but you may drop the two lowest scores.

**Examinations:** Students will be expected to demonstrate that they have met the course objectives through homework assignments and examinations. Three exams will be given (2 semester exams and 1 non-cumulative final including student presentation information). Exams will consist of multiple choice, short answer questions and short essay questions. Some exams may include self-evaluations or take-home questions with designated due dates listed on the assignment. It is your responsibility to clear your calendar and take the exam at the scheduled time and place. Reflections are designed to expand awareness of environmental health as it relates to that day’s reading assignment and class material; there are no make-up reflections for any reason—don’t ask. Except for emergency situations (e.g.,
medical, supported by appropriate documentation), make-up exams will not be given and zero credit will be awarded for missed exams.

**Project/Presentation:** The four components of the presentation exceed the points of one exam. Select a topic related to environmental or occupational health of interest to you. Make sure your topic has a quantitative assessment component. Research the topic and schedule an appointment to discuss the topic with the instructor or TA as designated (see syllabus details for dates). The schedule sheet will be circulated during class and then posted in D2L. The same procedure will be used to schedule for outline/preliminary presentation review in late March. Appointments are allocated on a first come, first served, basis. Following the outline/preparation review, adjustments should be made prior to class the draft presentation due date. Grades will be derived from evaluations by peers, faculty and graduate students. (Grading rubric will be provided at the time of outline/presentation preliminary review). Instructions for presentation development will be posted on D2L.

**Self-Evaluations:** Prior to undertaking a new educational opportunity, it is useful to perform a personal assessment of what you know about the topic. The goal is to learn more through personal investment throughout the semester. At the end of the course it is useful to look at what you learned and assess personal progress. To encourage this behavior, 25 points are awarded for both the initial and final personal assessment. These assessments are listed under “Quizzes”/Surveys in D2L. Due dates are listed in the course schedule below.

**Class Attendance/Participation:** Students are expected to attend every class meeting and participate in discussions. Students are expected to be present for every class. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean’s designee) will be honored.

**Additional Information:**

**Communications:** You are responsible for reading emails sent to your UA account from your instructor and the announcements that are placed on the course web site. Information about readings, news events, your grades, assignments and other course related topics will be communicated to you with these electronic methods. The official policy can be found at: [https://www.registrar.arizona.edu/personal-information/official-student-email-policy-use-email-official-correspondence-students](https://www.registrar.arizona.edu/personal-information/official-student-email-policy-use-email-official-correspondence-students)

**Accessibility and Accommodations:**
At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, you are welcome to let me know so that we can discuss options. You are also encouraged to contact Disability Resources (520-621-3268) to explore reasonable accommodation. If our class meets at a campus location: Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable. For additional information on Disability Resources and reasonable accommodations, please visit [http://drc.arizona.edu/students](http://drc.arizona.edu/students)

**Code of Academic Integrity**
Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercise must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity, available through the office of the UA Dean Students: [http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity](http://deanofstudents.arizona.edu/policies-and-codes/code-academic-integrity)

**UA Smoking and Tobacco Policy:**
The purpose of this Policy is to establish the University of Arizona’s (University) commitment to protect
the health of University faculty, staff, students, and visitors on campuses and in its vehicles. The official policy can be found at:  http://policy.arizona.edu/ethics-and-conduct/smoking-and-tobacco-policy

**University Course Policies:** (please see the following URL):
https://academicaffairs.arizona.edu/syllabus-policies

**Phone and Computer Use:** You may use your computer or other electronic devices during class purposes only. Email, shopping or working on other course assignments are disruptive to lecturers and other students and thus not allowed.

**Plagiarism:** It is not ALL about citation. What counts as plagiarism?
- Copying and pasting information from a web site or another source, and then revising it so that it sounds like your original idea.
- Doing an assignment/essay/take home test with a friend and then handing in separate assignments that contain the same ideas, language, phrases, etc.
- Quoting a passage without quotation marks or citations, so that it looks like your own.
- Paraphrasing a passage without citing it, so that it looks like your own.
- Hiring another person to do your work for you, or purchasing a paper through any of the on- or off-line sources.

Identified cases of plagiarism will be referred to the Dean of Students as an academic violation and a 0 grade will be awarded for the assignment. You may be expelled for violations of the code of conduct and this is one such violation.

**Course Schedule:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic &amp; Lecture Objectives</th>
<th>TEXT CHAPTER</th>
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<tbody>
<tr>
<td>Jan 16</td>
<td>Course introduction, paradigms and ethics (Reynolds)</td>
<td>1, 10</td>
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<tr>
<td></td>
<td>1. Understand introductory/syllabus material</td>
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<td>2. Self-evaluation</td>
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<td>3. Ethics and Public Health</td>
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<td>4. Project topic discussion</td>
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<td>Jan 23</td>
<td>Water quality (Reynolds)</td>
<td>16 Suppl. D2L</td>
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<tr>
<td></td>
<td>1. Use of risk assessment in water quality regulation</td>
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<td></td>
<td>2. Be able to discuss water cycle, availability and quality.</td>
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<td>3. Be familiar with primary water hazards/risks</td>
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<td>4. Discuss strategies of maintaining water quality</td>
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<tr>
<td>Initial Self-Evaluation due Jan 24</td>
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**Project Assignment:** Sign up for a topic and meet with Instructor/TA prior to January 31.

| Jan 30  | Toxicology (Burgess)                                                                      | 6, 7         |
|         | 1. Understand toxicokinetics, dose-response relationships and toxicity terminology.       |              |
|         | 2. Give examples of organ specific toxicity with representative toxicants.                |              |
|         | 3. Identify sources of variation in individual susceptibility to toxicants.               |              |
|         | 4. Explain how current regulatory limits are developed                                   |              |
Feb 6 4. Recreational water, soils and emerging infections (Reynolds) 2, 25, Suppl. D2L
   1. Understand the role of environmental waste management on drinking and recreational water quality.
   2. Identify the public health risk of recreational waterborne exposures.
   3. Describe the physical-chemical characteristics of soil
   4. Understand the relationship between soil characteristics and contaminant transport/fate
   5. Discuss methods of analysis for basic soil properties
   6. Evaluate tools for assessing geographical information related to environmental/ecological health

Feb 13 5. Risk assessment (Humble) 27
   1. Introduction to risk assessment
   2. Describe how risk assessments are carried out.
   3. Consider the role of environmental toxicants in disease clusters.
   4. Describe risk communication principles

Feb 20 6. Exam I (4:00-5:15 PM)

Food Safety (5:30 to 6:45 PM) (Verhougstraete) 18, 19
   1. Evaluate food contamination and its role in public health.
   2. Identify sources and types of food contaminant and ways to mitigate exposure.
   3. Learn methods to minimize food contamination during handling.
   4. Know agencies (and their role) responsible for food safety.
   5. Identify food environments.

Feb 27 7. Occupational and environmental health (Griffin) 8, 21, 23
   1. Explain the history of occupational and environmental health and pertinent regulations.
   2. Describe the worker’s compensation system.
   3. Explain the role of industrial hygiene in worker health and safety.

Presentation Outline: Sign up for review meeting with Instructor/TA prior to March 6. Bring detailed outline.

Mar 5 8. Pediatric environmental health (4:00 to 5:15 PM) (Beamer) 11, 20, Suppl. D2L
   1. Specify differences between children and adults in activity, physiology and other factors that affect their exposure to environmental hazards
   2. Be able to conduct an environmental history and home inventory
   3. Identify, prevent and control environmental hazards with respect to children
   4. Discuss how other factors including socioeconomic status and obesity may contribute to increased risk

Radiation (5:30 to 6:50 PM) (Sandstrom) 22
   1. Describe Radiation Fundamentals
   2. Identify sources and health effects of radiation exposure
   3. Understand regulatory aspects of radiation and methods to control exposure

Mar 12 9. ****UA Spring Break- no class****

Mar 19 10. Virus, vectors and disease (4:00- 5:15 PM) (Sexton) 12, 24
   1. Examine historical outbreaks
   2. Understand the basic dynamics of vector-borne disease
3. Examine the links between climate/climate change and vector borne disease
4. Evaluate emerging infectious diseases
5. Discuss potential strategies to predict and mitigate future outbreaks

Presentation Draft due in D2L Dropbox prior to March 27.

Mar 26 11. **Exam 2** (4:00-5:15 PM)

Energy, transportation and urbanization (5:30-6:50 pm) (O’Rourke) 3, 14
1. Identify energy resources and the pollutant yield from each source.
2. Identify current energy sources and anticipate the rate and consequence of their expenditure.
3. Anticipate and recognize the impacts of population expansion and migration on communities and their resources,
4. Identify management and control strategies addressing the impacts of population expansion and migration on human health,
5. Examine transportation needs and impacts
6. Examine relationship between urbanization and transportation while considering impacts on health

Apr 2 12. Ambient and indoor air quality (O’Rourke) 13, 17
1. Anticipate pollutant generation and dispersal
2. Understand how to control and manage air pollution
3. Integrate and discuss population pressure, urbanization, transportation, energy availability, weather, climate and their collective impact on air quality and health
4. Realize each pollutant behaves differently. Discuss diurnal, temporal and annual variability for individual criteria pollutants
5. Evaluate duration of exposure differences between indoor and outdoor air
6. Identify and evaluate dominant indoor air pollutants and compare with outdoor Ventilation
7. Consider the different types of contaminants found in indoor environments vs. ambient air
8. Identify ways to control indoor contaminant

All Submit Final Presentation to the D2L Dropbox by April 16

Apr 9 13. Climate change, population pressure and sustainability (O’Rourke) 12, 15
1. Understand drivers of climate change and impacts of air, land & sea
2. Determine control or mitigation approaches that could be employed.
3. Examine the impact of population pressure and resource use on climate change.
4. Examine the impact of declining energy, population pressure, changing climate on outcomes that may be social warfare or active military action

Apr 16 14. Presentations Group 1

Apr 23 15. Presentations Group 2

Environmentally Acquired Illnesses/One Health (Reynolds)
1. Assess and identify EAI hazards
2. Interrelate the role of a One Health approach to EAI hazard identification and exposure assessment
3. Compare traditional and nontraditional approaches to EAI risk characterizations
4. Evaluate treatment needs and mitigation impacts

Apr 30 16. Preparedness (Arora) 26, 28
1. Specify approaches for assessing, preventing and controlling hazards that pose risks to human health and safety during a manmade or natural disaster.
2. Describe the direct and indirect human, ecological and safety considerations of major environmental, biological, chemical, and radiological agents encountered in a disaster.
3. Describe federal and state preparedness and response guidelines
4. Discuss various risk assessment and control approaches in relation to disasters and illnesses

Final Self-Evaluation due May 6

FINAL EXAM- Wednesday May 13, 6-8 pm Drachman Hall A118