Syllabus
Environmental Monitoring and Analysis
Fall 2020

Time: Tuesday 9:00-11:00 and Thursday 9:00-Noon

Location: Class Location: Drachman Hall, Room A122
Lab Location: MRB 130

Instructor: Jonathan Sexton, PhD
MEZCOPH/CEP - EHS
Office: MRB 113
Phone: 520-626-4938
Email: sextonj@email.arizona.edu
Office Hours: By appointment – communication by email is best.

Teaching Assistant: Muath Almoslem
Office: Drachman Hall, cubicle in front of room A223
Email: muathalmoslem@email.arizona.edu
TA Office Hours: By appointment

Catalog Description: Environmental Monitoring and Analysis

Course Description: Introduction to multi-media sampling techniques and analytical methods for evaluation outdoor/indoor air, soil/surfaces, and water. The course will cover environmental science and industrial hygiene approaches for anticipating, recognizing, evaluating, and controlling hazards, with the primary focus on recognition and evaluation of contaminants, including data interpretation for risk reduction and regulatory compliance. The course will also emphasize environmental investigative techniques, instrument selection, and quality control, including documentation, calibration, and sample management.

Course Prerequisites: CPH 584 concurrently, or permission of the instructor.

Course Objectives and Expected Learning Outcomes:

1. Course Objectives:
   Monitoring is critical to the assessment of environmental hazards, whether those environments are outdoors, indoors, at work, or at home. Standard sampling and analytical techniques have been developed to assess contaminant levels for a variety of media, including water, air, and living systems (bio-markers and microbiology). While techniques for sampling are, in general, fairly standard, new analytical methods are also developed when existing methods are insufficient to quantify contaminant levels. This course will introduce
multi-media sampling techniques and analytical methods for evaluation outdoor/indoor air, soil/surfaces, and water.

2. **Graduate Student Learning Outcomes (Competencies Obtained):**
   Upon completion of this course students will be able to:

   **MPH Level EOH Competencies**

   - Recognize and classify the major types of chemical, physical and biological exposure agents capable of inducing disease in the public (assessed in post lab write up 5-7)
   - Utilize basic strategies for evaluating or measuring exposure to chemical, physical and biological agents (assessed in post lab write ups 1-12 and debates 1-2)
   - Describe factors which influence the behavior of aerosols and their ultimate fate including deposition in the respiratory system (assessed in post lab write ups 1 and 3)
   - Utilize appropriate technical approaches for conducting environmental and industrial assessments (assessed in post lab write ups 1-12 and final exam)
   - Utilize various sources of information to identify chemicals commonly employed in industry and their toxicity (assessed in post lab write up 3 and 5)
   - Describe the base mechanism of toxicity and potential health effects and diseases caused by various chemical agents (assessed in post lab write up 6)
   - Identify the steps involved in environmental and occupational health research (assessed in post lab write ups 1-12)

   **MPH Level EOH Competencies – Industrial Hygiene**

   Identify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes (assessed in post labs 2, 3 and 6)
   - Describe qualitative and quantitative aspects of generation of agents, factors, and stressors (assessed in post lab write ups 2)

   **MS Level EHS Competencies**

   - To demonstrate fundamental knowledge of the principles of environmental health sciences
   - and be able to apply them (assessed in post labs 1-12)
   - To develop and implement a basic study design addressing a testable hypothesis (assessed in post labs 1-12)
   - To implement assigned research or work tasks including, data collection and management, evaluation, and data analysis (assessed in post labs 1-12)
   - To demonstrate knowledge of local, federal and state regulatory programs (assessed in post lab write ups (3 and 5)
• To identify barriers that impact project completion and communicate them effectively to the appropriate people (assessed in post lab writeups 3 and 5 and debates 1-2)
• To develop effective written and oral communication skills (assessed in post lab writeups 1-12 and debates 1-2)

PhD Level EHS Competencies

• To exhibit a comprehensive knowledge of the principles of environmental health sciences (assessed in post lab writes 1-12)
• To develop new, innovative, applied or theoretical knowledge through research of health-related issues (assessed in post lab write ups 2-12)
• To develop expertise in an environmental health science subspecialty (assessed in post lab write ups 2-12)
• To comprehensively review and evaluate the scientific data, and gather and/or analyze preliminary data to develop testable hypotheses, study design(s) and research assessment protocols (assessed in post lab writes ups 1-12)
• To select and utilize appropriate tools of Environmental Health Sciences (may include exposure science, risk assessment modeling, risk management, risk communication and others depending on the project) (assessed in post lab writes up 1-12)

In-person:

This class is scheduled to be taught in the IN-PERSON modality.

● If the COVID-19 situation permits, we will be meeting Tues (9am-11am) and Thurs (9am-12pm). During our class meetings, we will respect CDC guidelines, including restricted seating to increase physical distancing and appropriately-worn face coverings. See below for the University’s policy on wearing face coverings in University buildings. [Official language: https://president.arizona.edu/news/2020/07/administrative-directive-use-face-coverings] ○ The Disability Resource Center is available to explore face coverings and accessible considerations if you believe that your disability or medical condition precludes you from utilizing any face covering or mask option. DRC will explore the range of potential options as well as remote course offerings. Should DRC determine an accommodation to this directive is reasonable, DRC will communicate this accommodation with your instructor.

● If you feel sick:

○ Stay home. Except for seeking medical care, avoid contact with others and do not travel.

○ Notify your instructors if you will be missing an in person or online course.

○ Campus Health is testing for COVID-19 - please call (520) 621-9202 before you come in.

■ Campus Health is testing individuals who are concerned that they are infected with or have been exposed to COVID-19.
They continue to test only students, staff, and faculty of the University at this time.

Campus Health providers will evaluate patients and order testing if appropriate. Visit the Campus Health website for more information. Visit the UArizona COVID-19 page for regular updates.

- If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office can be reached at 520-621-2057 or DOS-deanofstudents@email.arizona.edu

- Exams: There is only a final exam in this course. It will be given in-person. Students not currently on-campus will be able to take the exam in the fall following a hands-on refresher course.

- If pandemic conditions warrant, the University may require that we move to remote operations. If that is the case, we will notify you by D2L Announcement and email that we are moving to remote operations. In that case, we will meet by Zoom at the normal class time.

- After the Thanksgiving holiday, we are scheduled to move to remote teaching only. This course will end prior to Thanksgiving with the final being administered in the spring.

Class Recordings:

- For lecture recordings, which are used at the discretion of the instructor, students will access content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. Students accessing unauthorized recordings or using them in a manner inconsistent with UArizona values and educational policies are subject to suspension. All recordings are the property of the faculty member.

- It is strongly recommended that content delivery for in-person and flex in-person is recorded and available online.

Class Materials: All materials will be provided on the D2L site at www.d2l.arizona.edu. You are required to be prepared and participate fully in all classes and labs. Assignments should be read prior to respective lecture and lab times. Pre-lab preparations should include practicing the posted calculations and reviewing lab procedures, otherwise it is very unlikely that you will complete the laboratory activities in the time allotted.

Recommended Texts/Readings: No text book is required. All required materials will be made available on D2L. However, the following books are recommended, depending on your discipline and career goals:


Class Attendance/Participation: When in class, you are expected to participate fully. You are expected to submit assignments on time. Late assignments will be deducted 10% per day. After 3 days late assignments will no longer be accepted. All assignments are due at the beginning of class. If you are unable to attend a lecture it is your responsibility to get notes from a fellow student. All labs must be attended as no make-up labs will be given.

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 also be honored.)

Lab Safety: For your safety and the safety of those around you, you will be expected to follow the general lab rules. For all labs closed toe shoes must be worn. If you show up in sandals you will be asked to leave and return with the appropriate shoes. No food or drink will be allowed in the lab areas. There will be designated areas where your food and drink can be stored for the class period. We will be working in active labs for many of the labs so be mindful of things going on around you. Some of the labs will be held outside so dress appropriately for the weather and be sure to bring water on these days.

Grading/Student Evaluation: Student evaluations will be made based on accumulation of points as follows:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Certs</td>
<td>10</td>
</tr>
<tr>
<td>Post Labs</td>
<td>180</td>
</tr>
<tr>
<td>Debates</td>
<td>50</td>
</tr>
<tr>
<td>Final Project</td>
<td>150</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>490</strong></td>
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<table>
<thead>
<tr>
<th>Grades</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>&gt; 441</td>
</tr>
<tr>
<td>B</td>
<td>392</td>
</tr>
<tr>
<td>C</td>
<td>343</td>
</tr>
<tr>
<td>D</td>
<td>294</td>
</tr>
<tr>
<td>E</td>
<td>&lt; 294</td>
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Required Statements:

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

**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

**Plagiarism:** 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.

**Syllabus Changes:** Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.
Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Tues</th>
<th>Thurs</th>
<th>Due</th>
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<tbody>
<tr>
<td>24-Aug</td>
<td>Intro Calibration</td>
<td>IAQ</td>
<td></td>
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<tr>
<td>31-Aug</td>
<td>Water Chemical</td>
<td>Lab: Water Chemical</td>
<td></td>
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<tr>
<td>7-Sep</td>
<td>Particulates</td>
<td>Lab:SOP</td>
<td></td>
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<tr>
<td>14-Sep</td>
<td>Lab: Calibration</td>
<td>Lab: IAQ</td>
<td></td>
</tr>
<tr>
<td>21-Sep</td>
<td>Gas/Vapor</td>
<td>Particulates, Lab: IAQ, Gas/Vapor/Particulates</td>
<td>Water Chemical</td>
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<tr>
<td>28-Sep</td>
<td>Real Time</td>
<td>Lab: Real Time</td>
<td>Calibration</td>
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<tr>
<td>5-Oct</td>
<td>Survey/Anticipate</td>
<td>Equipment Day</td>
<td>IAQ/Mold Debate</td>
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<tr>
<td>12-Oct</td>
<td>Soil</td>
<td>Lab: Soil</td>
<td>Gas/Vapor</td>
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<tr>
<td>19-Oct</td>
<td>Fomites</td>
<td>Lab:Fomites</td>
<td></td>
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<tr>
<td>26-Oct</td>
<td>Evaluation/Control/Lab Fomites</td>
<td>Post Lab Day</td>
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<tr>
<td>2-Nov</td>
<td>Water Biological</td>
<td>Lab: Water Biological</td>
<td>Fomites</td>
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<tr>
<td>9-Nov</td>
<td>Biomarker/ Lab: Water Biological</td>
<td>Lab: Biomarkers</td>
<td>Soil</td>
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<tr>
<td>16-Nov</td>
<td>Lab: Biomarkers</td>
<td>Equipment Day</td>
<td>Water Debate/Water Biological</td>
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<td>23-Nov</td>
<td>Final</td>
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<td>Biomarkers</td>
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<td>30-Nov</td>
<td>Final Project</td>
<td>Final Project</td>
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<td>7-Dec</td>
<td>Final Project</td>
<td>Reading Day</td>
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<tr>
<td>17-Dec</td>
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<td></td>
<td>Final Project</td>
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