SYLLABUS  
Physical Exposures EHS 510  
Spring 2019

Time: Monday, 9-11:50am  
Location: Drachman Hall, Room A120

Instructor and Contact Information: Stephanie Griffin, Ph.D. CIH  
MEZCOPH/CEP  
Office: Drachman Hall, Room A241  
Phone: (520) 626-9363  
Email: scgriffin@email.arizona.edu

Office Hours: Wednesday and (most) Fridays*, 10am-12pm or by appointment  
*students will be notified in class, on D2L and/or by email if Friday office hours need to be rescheduled to accommodate faculty meetings, etc.

Teaching Assistant: none

Catalog Description: Participants will understand the health effects, evaluate exposures, and identify control options available to reduce exposures to physical stressors in the environment. The course focuses on noise, heat stress, vibration, radiation and ergonomics.

Course Prerequisites: None. For all students, it is recommended that you have taken a college level general chemistry class (at least at the Chem 103 level), introductory statistics (e.g., CPH 376), and algebra class (e.g., Math 112).

Course Objectives and Expected Learning Outcomes:

Course objectives

1. Anticipate and recognize the major types of physical exposure stressors capable of inducing disease in occupational populations.
2. Understand the basic strategies for evaluating or measuring exposure agents and health effects and relating these measurements to permissible exposure and other regulatory and recommended limits. This will include hands-on use of some of the equipment typically used to evaluate these hazards.
3. Appreciate techniques for controlling exposures to physical agents.
4. Appreciate some of the ethical and economic challenges to controlling physical exposures in the workplace.

At the end of this course, students will be able to (expected learning outcomes):

5. Anticipate, recognize, evaluate and develop control plans for the major types of physical exposure stressors capable of inducing disease in occupational populations, including thermal stress, radiation and noise.
6. Understand the physiological effects of physical exposures.
7. Specify correct PPE for physical exposures.
8. Correctly apply legal standards to physical exposures in the workplace.
MPH EOH-IH Competencies

1. Understand physiological and/or toxicological interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body [Four in-class quizzes and the final exam assessed on student understanding of the Occupational Hearing Conservation certification materials, including physiological and toxicological interactions with the human body.]

2. Recommend and evaluate engineering, administrative, and personal protective equipment, controls, and/or interventions, to reduce or eliminate hazards [Four in-class quizzes and the final exam assess student understanding of the Occupational Hearing Conservation certification materials, including noise controls and interventions.]

Course Notes: You are expected to take your own notes on the readings/videos/podcasts you will complete outside of class. It is also recommended that you take notes in class, during discussions and group activities. If feasible, the results of discussions/activities will be posted on D2L following the class. Additional content or printed material may be distributed in class. These materials will be posted on the D2L site under the appropriate class date/subject heading.

Required Text/Readings: Our textbooks/resources for the course are outlined below:

1. OH Learning texts - available on D2L
2. Quantitative Industrial Hygiene: A Formula Workbook (J. Caravanos) – provided for your use
3. CAOHC Hearing Conservation Manual Fifth Edition (Hutchison and Schulz, Editors) – Students wishing to complete the CAOHC Occupational Hearing Conservation (OHC) certification as part of this course should plan to buy this text; estimated cost = $60. Readings from this text form the basis for the lectures and instruction for the lectures on noise and hearing conservation in this course. More details will be provided soon on how to purchase this text.

Other recommended references:

2. *Occupational Environment - Its Evaluation, Control, and Management (3rd Edition)* – eBook through the AHSL Library

Other assigned readings will be provided as well, usually on D2L. Any required readings not on the syllabus will be announced and made available a week in advance.

Required or Special Materials: None

Course Requirements:

1) *Active learning* – This is not a lecture-based course. You will be expected to come to class prepared, having already read the assigned material (or watched any assigned videos or listened to any assigned podcasts), and with your homework or writing assignments completed, to the best of your ability. We will spend most of our in-class time engaged in discussions, doing activities and group work that will reinforce what you learned in the readings/videos/podcasts. If you are expecting to sit quietly in your chair and listen to me speak for 3 hours a week, you may find yourself frustrated and disappointed.

2) *Community* - Your fellow students will be relying on you to be prepared and not hold them back in their learning process. Your part of the bargain in this learning environment is to bring your best effort to this
course. My part of the bargain is to provide you with interesting, inspiring and exciting learning opportunities, and to help create an environment that helps you reach your potential. Please consider dropping this course if you are not prepared to give it your best. If, however, you are ready to learn and engage with others in a very interesting subject, I believe you will find your experience in this course very rewarding.

3) Perspective – This course is designed to train industrial hygienists (IH) professionals. While this might not describe you (yet), you will use this perspective when completing assignments and during in-class discussions.

4) Time investment – The “rule of thumb” for college courses is that students will spend 3-4 hours on course work for each hour of in-class instruction. We will meet for approximately 45 required hours. You will spend an additional 135 to 180 total hours of your own time preparing for class. That averages out to approximately 8 to 11 hours per week, outside of class.

You are expected to come to class prepared, respond to questions and participate in discussions, submit homework and assignments on time, and successfully complete any work given during scheduled classes. Changes and other information about the class will be posted on D2L and/or mailed to your University of Arizona e-mail address through D2L.

Grading Scale/Student Evaluation and Policies:
Final grades will be based on the following point system:

<table>
<thead>
<tr>
<th>Task</th>
<th>Potential Points</th>
<th>% of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific article reviews x 3</td>
<td>10 each</td>
<td>30</td>
</tr>
<tr>
<td>Quantitative IH Workbook – 3 chapters</td>
<td>10 each</td>
<td>30</td>
</tr>
<tr>
<td>In-class quizzes</td>
<td>15*</td>
<td>10</td>
</tr>
<tr>
<td>Non-ionizing radiation/EM spectrum group assignment and presentation</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>UA-RLSS Laser Radiation Protection Course certificate</td>
<td>10</td>
<td>10</td>
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<tr>
<td>UA-RLSS Radioactive Material Protection Course certificate</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>100%</td>
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</tbody>
</table>

A: >89.5%; B: 79.5-89.4%; C: 69.5-79.4%; D: 59.5-69.4%; F: <59.5%
*Five bonus points built into in-class quizzes

All late assignments will be penalized 10% per day, beginning at the end of the class on the day the assignment is due. For example, if the assignment is due in class on a Monday, it will be marked down 10% if it is turned any time Monday after class. Please contact Dr. Griffin in advance if you know you will be absent to arrange for an alternative time to turn in the assignment. Exams must be completed during the specified time. There will be no make-up exams.

Academic misconduct (i.e., cheating, plagiarism) will be penalized with a grade of zero points for the assignment.

Requests for incompletes (I) and withdrawal (W) must be made in accordance with University policies. University policy regarding grades and grading systems is available at: [http://catalog.arizona.edu/policy-type/grade-policies](http://catalog.arizona.edu/policy-type/grade-policies).

400/500 Co-Convened Courses: N/A

Required examinations, papers and projects: Required assignments are outlined above and in the course calendar below. Dates for in-class quizzes are not specified and may occur during any class period. Note: The University’s Final Exam regulations can be found here: [http://www.registrar.arizona.edu/staff/courses/final-exams?audience=staff&cat1=10](http://www.registrar.arizona.edu/staff/courses/final-exams?audience=staff&cat1=10)
**Required extracurricular activities**: None. Payment for and completion of the CAOHC Occupational Hearing Conservation materials/certification is optional.

**Course Schedule**: See below.

**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).

**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](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](https://academicaffairs.arizona.edu/syllabus-policies).

**References**: Several of the assignments require you to use references. Wikipedia is an acceptable “first look” resource but for written assignments, do not use Wikipedia as a primary source. You must go deeper, preferably using The University of Arizona library resources.

**Due Dates for assignments and Exam Dates are designated on the syllabus.** Do not rely on dropbox dates and times. These are sometimes inaccurate.

**Absence and Class Attendance/Participation**: Students are expected to attend every class meeting and participate in class discussions and activities. Students will participate in small group discussions on a regular basis.

The UA’s policy concerning class attendance, participation, and administrative drops is available at: [http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop](http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop)

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, [http://policy.arizona.edu/human-resources/religious-accommodation-policy](http://policy.arizona.edu/human-resources/religious-accommodation-policy).

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored, [http://deanofstudents.arizona.edu/](http://deanofstudents.arizona.edu/)

**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

**Classroom Behavior:**
Computers, tablets, cell phones, etc. use will be permitted during class for the purposes of locating information for discussions and activities when appropriate (the instructor will tell you when), *provided the technology is being used to aid in the learning process*. Use for entertainment or unrelated activities (email, games, social media, Youtube, TV/movies, etc.) is prohibited during class time. Appropriate use will be passively monitored by the instructor and TA. This policy is subject to revision if the technology privilege is consistently misused. Please turn your cell phone on vibrate or silent mode to avoid unnecessary interruption.

Students are expected to be familiar with the UA Policy on Disruptive Student Behavior in an Instructional Setting found at:  http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting

**Threatening Behavior Policy:** The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one’s self,  http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students

**Nondiscrimination and Anti-harassment Policy:** The University of Arizona is committed to creating and maintaining an environment free of discrimination,  http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

**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.

**Grievance Policy:** Should a student feel he or she has been treated unfairly, there are a number of resources available. With few exceptions, students should first attempt to resolve difficulties informally by bringing those concerns directly to the person responsible for the action, or with the student's graduate advisor, Assistant Dean for Student and Alumni Affairs, department head, or the immediate supervisor of the person responsible for the action. If the problem cannot be resolved informally, the student may file a formal grievance using the Graduate College Grievance Policy found at:  http://grad.arizona.edu/academics/policies/academic-policies/grievance-policy.

**Grade Appeal Policy:**  http://catalog.arizona.edu/2015-16/policies/gradappeal.htm

**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 plagiarism is one such violation.
<table>
<thead>
<tr>
<th>Session</th>
<th>Month</th>
<th>Date</th>
<th>Unit/Topic</th>
<th>Before Class Assignment (reading, etc.)</th>
<th>Due / Exam</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan</td>
<td>14</td>
<td>Course introduction (Shannon Newton)</td>
<td>OH Learning Basic Principles in Occupational Hygiene Chapter 18 (Intro to Ergonomics) Chapter 13 (Noise) Chapter 14 (Vibration)</td>
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<tr>
<td>2</td>
<td>Jan</td>
<td>21</td>
<td>MLK day – no class</td>
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<tr>
<td>4</td>
<td>Feb</td>
<td>4</td>
<td>Non-ionizing radiation (Shannon Newton)</td>
<td>OH Learning Basic Principles in Occupational Hygiene Chapter 16 Intro to Lighting and Non-ionizing Radiation (page 147-154) and Chapter 17 Ionizing Radiation (pages 155-163)</td>
<td><strong>Training must be completed prior to class. Bring your completion certificates with you and/or submit to D2L prior to class Group presentations on non-ionizing radiation due in class</strong></td>
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<tr>
<td>5</td>
<td>Feb</td>
<td>11</td>
<td>Laser and Ionizing radiation (Leon Harris)</td>
<td>UA RLSS Ionizing and Non-Ionizing Radiation training courses (LASER Radiation Protection Course and Radioactive Material Protection Course) <strong>See detailed instructions on last page of syllabus</strong></td>
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<tr>
<td>6</td>
<td>Feb</td>
<td>18</td>
<td>Occupational Hearing Conservation</td>
<td>Introduction to hearing conservation &amp; CAOHC Chapters 1 &amp; 3</td>
<td>Quantitative Industrial Hygiene Formula Workbook Chapter 5 (Ionizing and Non-ionizing Radiation)</td>
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<tr>
<td>7</td>
<td>Feb</td>
<td>25</td>
<td>Occupational Hearing Conservation</td>
<td>Effects of noise and hearing conservation principles Chapter 2</td>
<td>Scientific article review 1</td>
</tr>
<tr>
<td>8</td>
<td>Mar</td>
<td>4</td>
<td>Spring Break – no class</td>
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<tr>
<td>9</td>
<td>Mar</td>
<td>11</td>
<td>Occupational Hearing Conservation</td>
<td>Physics of sound; Standards and Regulations Chapters 6 &amp; 7 Noise measurement and control Chapter 8</td>
<td>Materials on D2L: • “Logarithms refresher” • “Noise terminology &amp; calculations”</td>
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<td>ACGIH TLV video “ACGIH_18OCT17_UpdatedTLVAudibleSound” Optional: White Book chapter 24 (on D2L)</td>
<td>• “Noise exercises” (you can also use the “solutions” document to help you work through the problems)</td>
</tr>
<tr>
<td>9</td>
<td>Mar</td>
<td>18</td>
<td>Occupational Hearing Conservation</td>
<td>Noise measurement and control, continued Chapter 8 Petrick et al. (on D2L)</td>
<td></td>
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<tr>
<td>10</td>
<td>Mar</td>
<td>25</td>
<td>Occupational Hearing Conservation</td>
<td>Anatomy and physiology of the ear (video) Chapter 4 Causes and management of hearing disorders Chapter 5 Non-auditory effects of noise: Basner et al. (on D2L) Cantley et al. (on D2L) Intro to audiometric testing</td>
<td>Scientific article review 2</td>
</tr>
<tr>
<td>11</td>
<td>Apr</td>
<td>1</td>
<td>Student presentations with ASSP local chapter</td>
<td>9-10am – Review Quant IH Chapter 4 problems; continue our Intro to audiometric testing lecture 10-1145am - Student research presentations with ASSP local chapter</td>
<td>Quantitative Industrial Hygiene Formula Workbook Chapter 4 (Noise)</td>
</tr>
<tr>
<td>12</td>
<td>Apr</td>
<td>8</td>
<td>Occupational Hearing Conservation</td>
<td>The audiometric program &amp; Understanding audiograms Chapters 9 &amp; 10 ** Audiometric practicum – ½ students</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Apr</td>
<td>15</td>
<td>Occupational Hearing Conservation</td>
<td>The audiometric monitoring program and the “problem audiogram” Chapters 11 &amp; 12 **Audiometric practicum – ½ students</td>
<td></td>
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<tr>
<td>14</td>
<td>Apr</td>
<td>22</td>
<td>Occupational Hearing Conservation</td>
<td>Hearing protection devices Chapters 13 &amp; 14 **HPD Practicum</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Apr</td>
<td>29</td>
<td>Occupational Hearing Conservation</td>
<td>Training and Motivation Recordkeeping and Program Evaluation Chapters 15 &amp; 16</td>
<td>Scientific article review 3</td>
</tr>
<tr>
<td>Session</td>
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<td>9</td>
<td>Final Exam</td>
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<td>OHC standardized exam – 1030-1130am</td>
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</tbody>
</table>

Rev. Jan 2019
Instructions to Laser and Radiation training:

1) Go to https://rgw.arizona.edu/compliance/RLSS and log in using your UA NetID
2) Go to the bottom of the “Courses” page
3) Under Ionizing and Non-Ionizing Radiation, select the “Homework” tab for “Laser Radiation Protection Course”
4) Complete the “Homework” including associated quizzes. Submit your completion certificate in Dropbox.

Ionizing & Non-Ionizing Radiation Training

- Gamma Irradiator Protection Course
- Imaging Laser Protection Course
- Laser Radiation Protection Course
- Moisture Gauge Protection Course
- Radiation Generating Machines Protection Course
- Radioactive Material Protection Course
- Sealed Source Protection Course

Homework

Full Course