Lecture Meetings: M, W 0800-0915 in FO 205

Instructor: Jason C. Paul, Ph.D.
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Office Hours: M, W 1300-1600
Or by appointment – email me to set up appointments

Course Description: This course emphasizes various levels of prevention and the scientific application of regulatory principles related to environmental health, safety, and management. Evaluation methods and general aspects of control measures relative to human and environmental health will be explored.

Program Learning Outcomes:
1. Demonstrate critical thinking and application of knowledge gained in the course that can be implemented in environmental health and safety assessment and management (PLO#1).
2. Students will be given real world scenarios that will require critical thinking in order to solve as related to environmental risk assessment (PLO#2).
3. Students will demonstrate knowledge of pertinent environmental regulations and how these regulations are to be applied in order to assure compliance and protect human and environmental health (PLO#3, PLO#1).
4. Demonstrate competency and critical thinking communicated through effective scientific written reports and oral presentations (PLO#4).
5. Know what formulas/statistics and how to apply them in environmental risk assessment (PLO#5, PLO#2).

M.S. Environmental Science Program Learning Outcomes Proficiency Levels

<table>
<thead>
<tr>
<th>Course</th>
<th>PLO #1 Environmental Health and Safety</th>
<th>PLO #2 Environmental Risk Assessment</th>
<th>PLO #3 Environmental Regulation and Compliance</th>
<th>PLO #4 Effective Scientific Written and Oral Reports</th>
<th>PLO #5 Statistical Methods and Data Management</th>
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<tbody>
<tr>
<td>ENV 504</td>
<td>M</td>
<td>A</td>
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<tr>
<td>N/A = Not Applicable B = Basic I = Intermediate A=Advanced M=Mastery</td>
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Student Learning Outcomes: Upon completion of the course, students should:
1. Students are expected to understand the components of an Environment, Health, and Safety program and how to implement it within a professional organization (PLO#1).
2. Students will understand how to perform a risk-based environmental assessment (PLO#2).
3. Students will know the regulatory requirement that govern environmental health and safety and what methods are used to assure compliance to the regulations (PLO#3).
4. Students will prepare written reports and procedures, which will help them develop the skill set expected of them when they enter their profession (PLO#4).
5. Statistical methods and data analysis will be introduced and utilized as pertaining to risk assessment (PLO#5, PLO#2)

Texts: Lectures will be based on the required text listed below and in part on supplementary texts and published articles. The articles will be posted on the Y: in the ENV504 folder. The subject of the articles may vary based upon student career interests and will represent recent literature and current events, which may be discussed in lecture as related to the topics listed further below.

Required texts:

Other Resources/References:
Occupational Safety and Health Administration
http://www.osha.gov/

United States Environmental Protection Agency
http://www.epa.gov/

Texas Risk Reduction Program Protective Concentration Levels
https://www.tceq.texas.gov/remediation/trrp/trrppcls.html

Agency for Toxic Substances and Disease Registry (ATSDR)
https://www.atsdr.cdc.gov/index.html

Agency for Toxic Substances and Disease Registry – Publications
https://www.atsdr.cdc.gov/publications.html

The National Institute for Occupational Safety and Health (NIOSH)
https://www.cdc.gov/niosh/index.htm

American Conference of Governmental Industrial Hygienists (ACGIH) – TLV/BEI Guidelines
https://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations/overview

American College of Occupational and Environmental Medicine (ACOEM)
http://www.acoem.org/

Topics List: The following is a list of topics this lecture will cover during the semester. The schedule and order of topics should be considered tentative based upon class progress and student interest. *Only required text-based chapter readings are included in the table below. The
student should be aware that additional handouts will be posted in Brightspace (D2L) and/or on the Y: for student reference. Posted handouts will in part be incorporated into lecture, which the student is expected to understand. A field trip to the Eastman Chemical plant in Longview, Texas is tentative based upon class availability outside of normally scheduled lecture period and Site Personnel availability.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Dates</th>
<th>Readings*</th>
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<tbody>
<tr>
<td>Introduction to Environmental Health</td>
<td>Week 1</td>
<td>Ch 1</td>
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<tr>
<td>Ecology and Ecosystems’ Role Upon Human Health</td>
<td>Week 2</td>
<td>Ch 2</td>
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<tr>
<td>Environmental Sustainability and Health Geospatial Applications for Environmental Health</td>
<td>Week 3</td>
<td>Ch 3</td>
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<td>Ch 5</td>
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<tr>
<td>Environmental and Occupational Epidemiology</td>
<td>Week 4</td>
<td>Ch 4</td>
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<tr>
<td>Worker Health and Safety Risk Communication</td>
<td>Week 5</td>
<td>Ch 21, Ch 23, Ch 28</td>
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<td>Introduction to Environmental Toxicology</td>
<td>Week 6</td>
<td>Ch 6</td>
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<td>Environmental Health-Based Risk Assessment</td>
<td>Week 7</td>
<td>Ch 27</td>
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<tr>
<td><strong>MIDTERM</strong></td>
<td><strong>2/27</strong></td>
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<td>Industrial Hygiene, Exposure Monitoring and Assessment</td>
<td>Week 8</td>
<td>Ch 8</td>
</tr>
<tr>
<td>Climate Change: Impacts on Human Health</td>
<td>Week 9</td>
<td>Ch 12</td>
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<td>Air Pollution</td>
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<td>Ch 13</td>
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<td><strong>SPRING BREAK</strong></td>
<td>Week 10</td>
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<td>Buildings and Construction Management Practices</td>
<td>Week 11</td>
<td>Ch 20</td>
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<td>Water Quality Impacts</td>
<td>Week 12</td>
<td>Ch. 13 and 16</td>
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<tr>
<td><strong>Written Case Scenarios (Grad) Due</strong></td>
<td><strong>3/25</strong></td>
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<td>Solid and Hazardous Waste</td>
<td>Week 13</td>
<td>Ch 17</td>
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<td>Research Paper Discussions</td>
<td>Week 14</td>
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<td>Pest Control and Pesticide Management Practices</td>
<td>Week 15</td>
<td>Ch 18</td>
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<td><strong>Case Scenario Presentations</strong></td>
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<td>Radiation Review</td>
<td>Week 16</td>
<td>Ch 22</td>
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<td><strong>FINAL EXAMINATION</strong></td>
<td><strong>5/5; 8-10:30 am</strong></td>
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**Grading:** Grades in this class will be based on a combination of in-class exams and written and oral presentation assignments according to the following formula:

Assignments
- Case Scenario: 75
- Presentation: 25
- Homework (4 assignments @ 25 pts. ea): 100

Exams
- Mid-Term: 100
- Final Exam (Comprehensive): 100

Course grades will be based on the percentage of total available points accrued during the semester, according to the following formula: 90-100% = A, 80-89% = B, 70-79% = C. Graduates must earn 70% or greater in order to receive credit for the course.
Case Scenarios:
The intent of the case scenario exercise is to allow the student an opportunity to make practical use of the knowledge gained in this course. Imagine that you are working in any variety of capacities for an industry, a private consulting firm, a government agency, a research firm, etc. Provided below are three brief case scenarios with which you might be confronted. You will be assigned in a group(s) of 2-3 people who must work cooperatively as would be expected in the professional world. Each group will select one case scenario from the three and prepare a report based on Case Scenario-specific requirements listed below. Cooperative communication is essential. Students may play one or two roles as industrial hygienist, environmental scientist, legal counsel, public relations representative, environmental specialist, etc. General requirements for the Case Scenario reports are as follows:

1. Introduction providing a brief review of relevant scientific or related information regarding the issue in question. This is NOT intended to be a full comprehensive review of the literature.
2. Address the bullet-list questions/requirements under the chosen Case Scenario.
3. Each section of the written report should clearly indicate the student responsible for authorship of that section to demonstrate that each student has participated actively and meaningfully in the project.
4. The report should summarize findings and get directly to the point, as to what should be or should have been done. The report should be 10-12 pages in length (double-spaced), withCalibri, Cambria, or Times New Roman size 11-12 font. References must be included but may be listed separately. Pages are to be standard size (8.5 x 11 in) with one inch margins.

Outlined below are the three Case Scenarios from which each group should choose:

1.) Case Scenario 1: Flint, Michigan: This is a major nationally known environmental health issue that affected the community of Flint where coliforms and high levels of lead were detected in drinking water.
   a. Briefly discuss and address how changes in water treatment and water source created the issue.
   b. Discuss how local, state, and federal agencies failed to appropriately take action. What were the factors that prevented appropriate government intervention and response and what should have been done to address the community’s health concerns?
   c. Discuss in depth the steps that Virginia Tech took in investigating the extent of the issue. How did Dr. Marc Edwards address the issue once the data was analyzed?
   d. Outline the steps that should be taken when addressing an environmental health concern such as investigating contaminated (or potentially contaminated) drinking water sources.

2.) Case Scenario 2: A spill has occurred at a refinery. Various constituents of concern (COCs) have been released into the soil, and preliminary data suggests that these COCs will soon enter the uppermost (shallowest) aquifer unless the affected soil is removed. The COCs with their average concentration in soil are as follows: benzene (2,000 mg/kg), toluene (10,000 mg/kg) and methyl-tert-butyl ether (5,000 mg/kg). You work for a consulting firm that has been hired to conduct remediation of the site. Remediation will
primarily consist of digging up the contaminated soil at depths of up to 8 ft. below ground surface. You are responsible for drafting A Soil Management and Health and Safety Plan that will also include environmental monitoring while the site is being remediated. In this plan, you must include:

a. Introduction – provide site background, the issue, and include a table given known concentrations of each COC in soil (1-2 pages).

b. Health and Safety Plan: Outline the list of project tasks and work scope, include list of personnel (this will be made up – choose socially acceptable names only), designate site safety officer (name of one of the people in the group), complete hazard analysis using Job Safety Analysis forms (a handout will be provided to the group to do this), air monitoring requirements, PPE requirements, decontamination control zone and procedure (5-7 pages)

c. Soil Management: Discuss how soil that is excavated will be handled (temporary storage for offsite transport, type of waste classification/landfill that will receive the waste), dust control, erosion control/stormwater runoff handling procedures (1-2 pages)

d. Emergency Action Plan: This is an emergency contacts table and hospital route map in case first aid must be rendered (1-2 pages).

e. Include Safety Data Sheets (SDS) of each COC for inclusion as an Appendix (the SDSs do not count towards typed report count)

3.) Pick a current event Environmental Health Topic. This will be based on current literature and news-related events/issues. The topic must be emailed to me on or before September 21. We will then discuss a planned outline/requirement for the individualized Case Scenario that will be equal in effort to the other two Case Scenarios listed above.

Exams: There will be 2 lecture exams during the course of the semester comprising a midterm and a final. Mid-terms are scheduled for February 27. The final will be comprehensive, with an emphasis on the last half of the course. The exams will consist of essay, problem solving, and short answer. The final will be given on Tuesday, May 5, from 8:00-10:30 AM.

Make-up Policy: Make up exams will be given only in the case of a documented, university-approved excuse. In this case, the make-up exam will be given as soon as possible after the scheduled exam date. I do not give make-up exams for unexcused absences; if you miss one it will count as a 0 and be averaged into your final grade. There are no make-ups for reports since these are assigned at the beginning of the semester and can be turned in anytime prior to the due date.

Late Submission of Assignments:
It is your responsibility to submit assignments at the time they are due. Work submitted after the due date will incur a 10% per calendar day penalty, (i.e., after 10 days you will receive a zero on the assignment). For excused absences of exams, you have 1 week to complete the make-up assignment before late penalties begin accruing. Writing assignments are still expected to be submitted on time since those are assigned in advance of the due date(s). For other information regarding make-up work, refer to the Make-up Policy section above.

Course Grades Policy (5.5): Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete
the work within one calendar year from the end of the semester in which they receive a WH, or
the grade automatically becomes an F. If students register for the same course in future terms the
WH will automatically become an F and will be counted as a repeated course for the purpose of
computing the grade point average. Please read the complete policy at
http://www.sfasu.edu/policies/5.5_course-grades.pdf

Other policies:
Attendance: I expect students to attend all lectures and arrive before the start of class time.
Individuals late to class may find themselves locked out. However, I believe you should be
treated as adults and the decision to come to class is ultimately yours. I do not take attendance in
lecture periods, but lack of attendance on your part will affect your grade.

Excused absences include participation in University-sponsored events, health problems, or
family emergencies. Documentation for excused absences must be provided. Notification of
planned excused absences should be provided. Make-up work will be accepted for a maximum
of 2 weeks following an excused absence. http://www.sfasu.edu/policies/class-attendance-and-
excused-absence-6.7.pdf

Responsible Use of Technology: It is expected that all students will only use cell phones, PDAs,
laptop computers, MP3 players and other technology outside of class time or when appropriate in
class. Answering a cell phone, texting, listening to music or using a laptop computer for matters
unrelated to the course may be grounds for dismissal from class or other penalties. Put them
away during any exam period; if I see a cell phone during an exam, I will consider that student to
be cheating on the exam with appropriate consequences.

Acceptable Student Behavior: Classroom behavior should not interfere with the instructor’s
ability to conduct the class or the ability of other students to learn from the instructional program
(see the Student Conduct Code, policy 10.4). Unacceptable or disruptive behavior will not be
tolerated. Students who disrupt the learning environment may be asked to leave class and may be
subject to judicial, academic or other penalties. This prohibition applies to all instructional
forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor
shall have full discretion over what behavior is appropriate/inappropriate in the classroom.
Students who do not attend class regularly or who perform poorly on class projects/exams may
be referred to the Early Alert Program. This program provides students with recommendations
for resources or other assistance that is available to help SFA students succeed. Please read the

Ethics and Professionalism: All of the students in this class and in the Arthur Temple College of
Forestry and Agriculture are expected to conduct themselves in an ethical and professional
manner.

Student Academic Dishonesty Policy (4.1): Academic integrity is a responsibility of all
university faculty and students. Faculty members promote academic integrity in multiple ways
including instruction on the components of academic honesty, as well as abiding by university
policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty:
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/4.1-student-academic-dishonesty.pdf

Consequences of Academic Dishonesty (Cheating):
The severest penalty (an F for the course) will be assigned to any student caught cheating or plagiarizing on an assignment.

Academic Accommodation for Students with Disabilities Policy (6.1): To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/
Students with documented disabilities who require course adaptations or accommodations should make an appointment to speak with the Professor.

Smoking, Vaping, and Use of Tobacco Products Policy (13.21): States that campus is tobacco and vape free. This includes all tobacco and vape-related products, and includes all activities during field labs! See: http://www.sfasu.edu/policies/13.21_smoking-vaping-and-use-of-tobacco-products.pdf

Firearms, Explosives and Ammunition Policy 13.9: Concerns firearms and the concealed carry policy. Students with concealed carry licenses who choose to carry on campus are required to follow all Texas laws and University policies, and it is their responsibility to understand and comply accordingly. See: http://www.sfasu.edu/policies/13.9-Firearms-Explosives-and-Ammunition.pdf