ENVR/PHNU 423: Industrial Medicine and Toxicology
Course Syllabus

Spring 2018
Classes begin Wednesday, January 10, 2018 and end Friday, April 27, 2018

Faculty: Woodhall Stopford, MD
Duke Occupational and Environmental Medicine, DUMC
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stopf001@mc.duke.edu

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Occupational Health Nursing Program, UNC
Office Location: 1700 Airport Road, Room 337, Chapel Hill, NC
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Phone: 919-966-0979
susan.randolph@unc.edu

Course Prerequisites: None
Credits: 3

COURSE DESCRIPTION
Toxicological assessment of and a case presentation of related exposure is given. A conceptual approach is utilized to design appropriate programs to prevent worker ill health due to industrial toxicant exposure.

OBJECTIVES
1. Develop basic problem solving skills necessary to assess occupational and environmental concerns.
2. Utilize practitioners with expertise in industrial hygiene, nursing, epidemiology, occupational medicine, and toxicology when evaluating exposure situations.
3. Apply epidemiological, toxicological, industrial hygiene, and management skills in the problem solving process through the use of case studies.
4. Develop competency in how to obtain more information to be able to adequately address occupational and environmental issues.

COMPETENCIES
1. Fosters collaborative practice as a member of the interdisciplinary team with emphasis on occupational health and safety areas.
2. Uses written, oral, and technological strategies to communicate effectively with individuals, groups, and communities about occupational health and safety issues.
3. Develops, implements, and evaluates comprehensive occupational health and safety programs and services for diverse client populations.
4. Assumes occupational health leadership role in business, academia, government, and in the community.
5. Utilizes critical and creative thinking to identify trends in health and health care that impact workers and communities and determine appropriate intervention and prevention strategies.

6. Influences policy development and its implications on business, legislation/regulation; health care; occupational health and safety issue; and the environment.

7. Utilizes knowledge from occupational health sciences to assess and control exposures in work environments.

8. Applies ethical decision making principles, personal values and beliefs, and ethical behavior in situations requiring judgment.

**REQUIRED TEXT/READINGS**


Additional readings (pdf) are provided on the Sakai website; they can be found under Course Information, Readings. All required readings are marked with an asterisk (*). Other listed readings are for additional information if you are interested or having difficulty with the topic.

**ALTERNATE REFERENCES**


**TEACHING METHODS**

Lectures
Chat Sessions/Discussions
Individual/Group Work

**CHAT SESSIONS**

Chat sessions will be held every other week on Blackboard at a time mutually decided by faculty and students, typically a weekday evening for one hour. A case study will be posted ahead of time which faculty will expect students to have read and be prepared to discuss. After the chat session, the transcript will be available for your reference. Two points will be awarded to those who attend the live chat session.
EVALUATION

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Percent of Grade</th>
<th>Assignment Due</th>
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<tbody>
<tr>
<td>Midterm Exam (take home/open book):</td>
<td>30%</td>
<td>March 19, 2018</td>
</tr>
<tr>
<td>Approach to a specific exposure problem</td>
<td></td>
<td>(available March 5)</td>
</tr>
<tr>
<td>Powerpoint Slide Paper &amp; Presentation</td>
<td>20%</td>
<td>April 23, 2018</td>
</tr>
<tr>
<td>• Guidelines are listed below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Presentation using Blackboard Collaborate or Voice Thread</td>
<td></td>
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<tr>
<td>Chat Sessions (2 points per attended session)</td>
<td>10%</td>
<td>Date of Chat Session (TBA)</td>
</tr>
<tr>
<td>Final Exam (take home/open book):</td>
<td>40%</td>
<td>May 4, 2018</td>
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<tr>
<td>Multiple choice and short essays based on case histories</td>
<td></td>
<td>(available April 30)</td>
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<tr>
<td>Course Evaluation (required)</td>
<td>N/A</td>
<td>End of course</td>
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GUIDELINES FOR PAPER

Students will be asked to submit topics for their PowerPoint Paper to Dr. Stopford and Susan Randolph, which will be posted on Sakai. Two to four (2-4) students can work as a team to evaluate one chemical exposure situation or process. Please review your topic with Dr. Stopford before beginning the assignment. Some previous papers are posted on Sakai to give you an idea of what is expected.

The paper should be prepared as a PowerPoint slide presentation. It should be presented as a group using Voice Thread so all students can view and comment. The paper should address the following components:

- General toxicity of chemical(s) where an exposure may occur
- Exposure assessment: where can an over-exposure occur
- Monitoring program (both medical/epidemiological and industrial hygiene) for the examined situation
- Measures that can be taken to prevent excessive exposure

HONOR CODE

The University of North Carolina at Chapel Hill has had a student-administered honor system and judicial system for over 100 years. The system is the responsibility of students and is regulated and governed by them, but faculty share the responsibility. If you have questions about your responsibility under the honor code, please bring them to your instructor or consult with the office of the Dean of Students or the Instrument of Student Judicial Governance. This document, adopted by the Chancellor, the Faculty Council, and the Student Congress, contains all policies and procedures pertaining to the student honor system. Your full participation and observance of the honor code is expected.

Information about the Honor Code is listed in the Student Handbook. All written work should be submitted with the following pledge with your signature: “On my honor, I have neither given nor received unauthorized aid on this assignment.”
VALUING DIVERSITY
Promoting and valuing diversity in the classroom enriches learning and broadens everyone’s perspectives. Inclusion and tolerance can lead to respect for others and their opinions and is critical to maximizing the learning that occurs in this course. This may challenge our own closely held ideas and personal comfort zones. The results, however, create a sense of community and promote excellence in the learning environment.

Diversity includes consideration of (1) the variety of life experiences other have had, and (2) factors related to “diversity of presence”, including, among others, age, economic circumstances, ethnic identification, disability, gender, geographic origin, race, religion, sexual orientation, social position.

This class follows principles of inclusion, respect, tolerance, and acceptance that support the values of diversity.

The University of North Carolina at Chapel Hill is committed to equality of educational opportunity. The University does not discriminate in offering access to its educational programs and activities on the basis of age, color, creed, disability, gender, gender expression, gender identity, genetic information, national origin, race, religion, sex, sexual orientation, or veteran status. The Equal Opportunity and Compliance Office (100 E. Franklin Street, Unit 110, CB #9160, Chapel Hill, NC 27599-9160 or (919) 966-3576) has been designated to handle inquiries regarding the University’s non-discrimination policies. http://policies.unc.edu/policies/nondiscrim/

EXPECTATIONS
Students completing this course will develop basic problem solving skills necessary to assess occupational and environmental concerns. This course is based on case studies and will give students opportunities to interact with students in various occupational health disciplines. These case studies will demonstrate the usefulness of epidemiological, toxicological, industrial hygiene and management skills in the problem solving process. Although the content portion of this course focuses on toxicology and industrial medicine, it is an expectation that these same problem solving skills will be useful in addressing any occupational or environmental health issue. Students will be able to utilize effectively practitioners with expertise in the areas of industrial hygiene, epidemiology, industrial medicine and toxicology when addressing such problems. Students will develop competencies in how to obtain more information to be able to adequately address concerns.

OTHER
1. By enrolling as a student in this course, you agree to abide by the UNC-Chapel Hill policies related to the Acceptable Use of online resources. Please consult the Acceptable Use Policy (http://help.unc.edu/1672) on topics such as copyright, net-etiquette, and privacy protection.
2. As part of this course, you may be asked to participate in online discussions or other online activities that may include personal information about you or other students in the course. Please be respectful of the rights and protection of other participants under the UNC-Chapel Hill Information Security Policies (http://its.unc.edu/ITS/about_its/its_policies/index.htm) when participating in online classes.
3. When using online resources offered by organizations not affiliated with UNC-Chapel Hill, such as Google or Youtube, please note that the Terms and Conditions of these companies and not the University’s Terms and Conditions apply. These third parties
may offer different degrees of privacy protection and access to rights to online content. You should be well aware of this when posting content to sites not managed by UNC-Chapel Hill.

4. When links to sites outside of the unc.edu domain are inserted in class discussions, please be mindful that clicking on sites not affiliated with UNC-Chapel Hill may pose a risk for your computer due to the presence of malware on such sites.

GRADING SCALE

H/A: 93-100
P/B: 85-92
L/C: 80-84
F: Fail (below 80)
## ENVR/PHNU 423 Assignments
### Spring 2018

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture</th>
<th>Readings/Handouts</th>
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| Jan 8   | Classes start January 10, Principles of Toxicology/Risk Assessment | *LaDou*
|         |         | • Ch 4, Occup & Env Medical History (pp. 26-31)  
|         |         | • Ch 16, Medical Toxicology (pp. 223-234)  
|         |         | **Other Required Readings**  
|         |         | *Basic Principles of Toxicology*  
|         |         | *Factors Influencing Toxicology*  
|         |         | **Optional Readings**  
|         |         | Clinical Toxicology  
|         |         | TLVs & BEIs  
|         |         | General Approach to Risk Assessment |
| Jan 15  | Risk Assessment Problem Solving | *LaDou*
|         |         | • Ch 50, Health Risk Assessment (pp. 827-841)  
|         |         | **Other Required Readings**  
|         |         | *Cobalt Case Study & Information* (see course materials)  
|         |         | *Odds Ratios* (see course materials)  
|         |         | *Risk Assessment*  
|         |         | *Problem Solving*  
|         |         | **Optional Readings**  
|         |         | URLs for Toxicology Searches (see course materials)  
|         |         | OSHA Contacts for NC (see course materials)  
| Jan 22  | Neurotoxicology—Part 1 Lecture: CNS/PNS | *LaDou*
|         |         | • Ch 27, Neurotoxicology (pp. 425-435)  
|         |         | • Carbon Monoxide (pp. 268-269; 388-390; 430; 559-561)  
|         |         | **Other Required Readings**  
|         |         | *Neurotoxic Compounds #1*  
|         |         | *Mini-Mental State*  
|         |         | *Jacobs Mental Status Exam*  
|         |         | *Chronic Carbon Monoxide Poisoning materials*  
|         |         | **Optional Readings**  
|         |         | Hyperbaric Oxygen Treatment: H₂S  
|         |         | Case Series: Neurotoxicity among Hazardous Waste Incinerator Operators- Feb 2000  
|         |         | Welding and Manganese Exposure  
| Jan 29  | Lecture: Occupational Lung Disease and Reactive Airways Disease | *LaDou*
|         |         | • Ch 23, Occupational Lung Diseases (pp. 362-385)  
|         |         | **Other Required Readings**  
|         |         | *Particle Deposition and Clearance of Dust from Lungs*  
|         |         | *Pulmonary Function Terminology*  
|         |         | **Other Required Readings**  
|         |         | Cytotoxicity among Toxic Substances  
|         |         | Toxicity among Metals  
|         |         | Toxicity among Fungi  
|         |         | Toxicity among Plants  
|         |         | **Optional Readings**  
|         |         | URLs for Toxicology Searches (see course materials)  
|         |         | OSHA Contacts for NC (see course materials)  

**January 15, 2018 -- MLK Holiday**
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<tr>
<th>Week of</th>
<th>Lecture</th>
<th>Readings/Handouts</th>
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</table>
| Feb 5   | Lecture: Kidney Disease | *LaDou  
  • Ch 26, Renal Toxicology (pp. 415-424)  
**Optional Readings**  
LaDou  
• Ch 26, Renal Toxicology (pp. 415-424)  
**Optional Readings**  
Goodpasture's Syndrome (see course materials)  
Casarett & Doull's Toxicology, Ch. 14 (2001) |
| Feb 12  | Neurotoxicology—Part 2  
Lecture: Neurotoxicology (Brock) | *Other Required Readings*  
*Neurotoxic Compounds #2*  
**Optional Readings**  
LaDou  
• pp. 268; 394-395; 419-421; 430-431; 440; 456-458; 471-474; 715  
**Other Required Readings**  
*Contemporary Ceramic Study Studio  
*Lead and Its Compounds  
**Optional Readings**  
Lead Smelter Paper  
Lead and Fluoride in Water Paper  
Lead Poisoning in Taiwanese Workers  
Lead Exposure in Schools |
| Feb 19  | Lead and Its Compounds  
Lecture: Lead | *LaDou  
• pp. 268; 394-395; 419-421; 430-431; 440; 456-458; 471-474; 715  
**Other Required Readings**  
*Contemporary Ceramic Study Studio  
*Lead and Its Compounds  
**Optional Readings**  
Lead Smelter Paper  
Lead and Fluoride in Water Paper  
Lead Poisoning in Taiwanese Workers  
Lead Exposure in Schools |
| Feb 26  | Mercury  
Lectures: Mercury and Mercury in Dentistry | *LaDou  
• pp. 421-422; 431-432; 476-478; 611; 727  
**Other Required Reading**  
*Industrial Exposure to Mercury Case  
**Optional Readings**  
Chloralkali Studies  
External Links: Mercury |
| Mar 5   | Mar 5 - **Midterm exam available**  
Environmental Metals Lectures: Environmental Metals (Arsenic, Arsine, and Cadmium) | *LaDou  
• Ch. 30, Metals (pp. 463-485)  
• pp. 90-291; 271-272; 300-301; 338; 378; 394; 418; 421; 429; 566-567  
**Optional Reading**  
Environmental Arsenic Paper  
Environmental Cadmium Paper  
Environmental Mercury Paper  
Environmental Lead Paper |
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<th>Week of</th>
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<th>Readings/Handouts</th>
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<tbody>
<tr>
<td><strong>Spring Break: Week of March 12-16, 2018</strong></td>
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<tr>
<td>Mar 19</td>
<td><strong>Mar 19 - Midterm exam due</strong>&lt;br&gt;Asbestos&lt;br&gt;Lectures: Environmental Asbestos and Asbestos 1</td>
<td><em>LaDou</em>&lt;br&gt;• pp. 289; 292-293; 296; 380-381&lt;br&gt;&lt;br&gt;<strong>Optional Reading</strong>&lt;br&gt;Short Fiber Asbestos&lt;br&gt;WTC Dust Analyses&lt;br&gt;EPA Managing Asbestos in Place&lt;br&gt;External Links: WTC and Asbestos</td>
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<td>Mar 26</td>
<td>Silica&lt;br&gt;Lectures: Environmental Silica, Silica Immunotoxicology and Silica Case Study</td>
<td><em>LaDou</em>&lt;br&gt;• pp. 378-380; 422-423&lt;br&gt;&lt;br&gt;<strong>Other Required Reading</strong>&lt;br&gt;*Silica Risk Assessment Paper&lt;br&gt;*Silica and Pulmonary Fibrosis</td>
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<td>Apr 2</td>
<td>Solvents</td>
<td><em>LaDou</em>&lt;br&gt;• Ch. 32, Solvents (pp. 524-556)&lt;br&gt;&lt;br&gt;<strong>Optional Readings</strong>&lt;br&gt;Case Study: Carbon Disulfide</td>
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<td>Apr 9</td>
<td>Cobalt</td>
<td><em>LaDou</em>&lt;br&gt;• pp. 377; 394; 718&lt;br&gt;&lt;br&gt;<strong>Other Required Readings</strong>&lt;br&gt;*Cobalt Risk Assessment&lt;br&gt;&lt;br&gt;<strong>Optional Readings</strong>&lt;br&gt;ATSDR Risk Assessment for Cobalt&lt;br&gt;Cobalt Exposure Modeling</td>
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<tr>
<td>Apr 16</td>
<td>Another topic??</td>
<td></td>
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<tr>
<td>Apr 23</td>
<td><strong>PowerPoint Paper due; also present paper using Blackboard Collaborate or Voice Thread. Complete course evaluation as prompted by email</strong></td>
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<tr>
<td><strong>Final Exam</strong></td>
<td><strong>Final Exam will be available starting Monday, April 30 and is due no later than May 4, 2018.</strong></td>
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