

PHC 6702 – Exposure measurement and assessment  
Summer C 2008  
Tuesdays & Thursdays 2:00-4:00 pm, HPNP G307  
<http://lss.at.ufl.edu/>

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### **Course Overview**

This class will give you an understanding of exposure science in some depth. Exposure to chemical, physical and biological agents can occur through inhalation, ingestion, and contact with a variety of media. This is a critical step before any health effects may occur. In this course, we will explore methods to measure, estimate and prevent exposure to hazardous agents in the context of public health practice.

Understanding information without the ability to apply it does not constitute real knowledge. This course therefore emphasizes the use and application of the course material through problems and exercises. Some mathematical and statistical skills are necessary, and a general knowledge of physics, chemistry, and biology is helpful.

### **Course Objectives**

After successfully completing this course, you should be able to:

- ✓ Understand the role of exposure science in public health practice
- ✓ Develop exposure assessment strategies for health risk assessment
- ✓ Develop exposure assessment strategies for epidemiological studies
- ✓ Critically evaluate the scientific literature on exposure science
- ✓ Select and apply the appropriate techniques to measure or estimate exposure
- ✓ Understand the limitations of exposure data collection techniques
- ✓ Present the results of your exposure estimates effectively, in written and oral form

### **Course Materials**

#### **Textbooks:**

- 1) Exposure Analysis (**EA**), by W. Ott, A. Steinemann, L. Wallace. CRC Taylor & Francis, 2007, ISBN: 1-56670-663-7
- 2) Exposure Factors Handbook (**EFH**), US EPA, available online at:  
<http://www.epa.gov/ncea/efh/pdfs/efh-front-gloss.pdf>

### **Journal Articles & Reports (JA&R) -Available on the course web site**

- 1) WHO – Data Quality in chemical exposure assessment
- 2) Young et al., *Use of a crop and job specific exposure matrix for estimating cumulative exposure to triazine herbicides among females in a case-control study in the Central Valley of California*, *Occup. Environ. Med.*, 2004;61;945-951
- 3) Needham, et al, *Exposure Assessment in the National Children Study: Introduction*, *EHP* 2005, 113:1076-1082
- 4) Blando & Cohn, *Exposure and Health Risk from Swimming in Outdoor Pools Contaminated by Trichloroethylene*, *Human and Ecological Risk Assessment*, 2004, 10: 717–731
- 5) Laitinen et al., *Sound Exposure Among the Finnish National Opera Personnel*, *Applied Occupational and Environmental Hygiene*, 2003, 18:3, 177 – 182
- 6) FAA, *What aircrews should know about their exposure to ionizing radiation*
- 7) ICNIRP, *Epidemiology of Health Effects of Radiofrequency Exposure*, *EHP*, 2004, 112:17, 1741-54
- 8) BCWCB, *Bus Drivers & Human Vibration*
- 9) Pasanen, *A review: fungal exposure assessment in indoor environments*, *Indoor Air*, 2001, 11, 87-98
- 10) Delignette-Muller & Rosso, *Biological variability & Exposure Assessment*, *International Journal of Food Microbiology* 58 (2000) 203–212

### **Course Requirements**

#### **Quizzes**

There will be oral quizzes every time readings are assigned, and these will form a part of your final grade; not everyone will be quizzed each time, though. Both your knowledge of the readings and your ability to discuss them in a logical, organized manner will be assessed. Evaluation will be on a satisfactory/unsatisfactory basis. You may ask to be excused from class preparation *once* during the course; no explanations asked. Absence from a class results in later automatic quizzing on the topic of the missed class.

#### **Exams**

There will be a midterm exam, but no final exam.

#### **Homework Assignments**

There will be 7 homework assignments. Written assignments are to be turned in as a file on the class website by start of class of the day in which they are due. Late assignments may receive comments and corrections, but no credit.

You are expected to know how to use a spreadsheet for most of the assignments. This is an important professional skill that you should master in any case. The university offers free self-paced training on how to use Microsoft Excel at [www.cns.ufl.edu/training](http://www.cns.ufl.edu/training). You can consider yourself sufficiently proficient for this class if you know how to use formulas and series well.

### **Team Assignments**

Students will be assigned to teams for the duration of the course. Team challenges will be held on specific tasks and points will be assigned. At the end of the course, each member of the team with the most points will have his/her lowest homework score dropped from grade calculations.

### **Final Paper**

A 15-20 pages paper on a specific topic that interests you is due at the end of the course. A formal review of scientific literature is required. The topic title is due no later than July 8. A list of references and an outline are due July 24. Earlier requests for feedback are encouraged. The paper must be submitted through Turnitin@.

### **Grade components and grading scale**

You may choose the weights of the grade components that best fit your testing strengths, within the limits indicated. Total must be 100%. Your choice is due June 5<sup>th</sup>, in writing. Default weight is midpoint of range.

Midterm	>90%	A
15-25%	>85-90%	B+
Final paper	>80-85%	B
20-30%	>75-80%	C+
Homework	>70-75%	C
30-40%	>65-70%	D+
In-class quizzes	60-65%	D
15-25%	<60%	

### **Class Schedule**

Tue May 27  
*Introduction to Exposure Science*

Thu May 29  
*Basic concepts (Discussion & exercises)*  
Readings: EA, Chapters 1 & 2

Tue June 3  
*Variability and uncertainty in Exposure assessment*  
Readings: EFH, Chapter 2; JA&R #1 (WHO)

Thu June 5  
*Variability and uncertainty (Discussion & exercises)*  
Readings: EFH, Chapters 7 & 8  
HMWK 1 due

Tue June 10  
*Design of exposure studies*  
Reading: EA, Chapter 3

Thu June 12  
*Direct & Indirect Methods*  
Readings: EA, Chapters 5 & 17  
HMWK 2 Due

Tue June 17  
*Time/Activity Data*  
Readings: EFH, Chapters 15, 16 & 17

Thu June 19  
*Study Design (Discussion & exercises)*  
HMWK 3 Due

Tue June 24  
*Mathematical Modeling of Exposure*  
Readings: EA, Chapter 19

Thu June 26  
*Mathematical Modeling (Discussion & exercises)*  
Readings: EA, Chapter 18 (1 to 5 only)

Tue July 1  
Midterm Exam

Thu July 3  
*Occupational Exposures*  
Readings: EFH, Chapter 16; EA, Chapter 15; JA&R #2 (Young)

Tue July 8  
*Children's Exposures*  
Readings: EFH, Chapter 14; JA&R #3 (Needham)  
HMWK 4 due  
Paper title due

Thu July 10  
*Inhalation Exposures*  
Readings: EA, Chapters 4, 6

Tue July 15  
*Inhalation Exposures (Discussion & exercises)*  
Readings: EFH, Chapter 5; EA, Chapter 8

Thu July 17  
*Ingestion Exposures*  
Readings: EA, Chapter 13; EFH, Chapters 9 to 13

Tue July 22  
*Ingestion Exposures (Discussion & exercises)*  
Readings: EFH, Chapters 3 & 4  
HMWK 5 due

Thu July 24  
*Dermal Exposures*  
Readings: EA, Chapters 11 & 12  
Paper outline & references list due  
HMWK 7 data due

Tue July 29  
*Dermal & Multimedia Exposures (Discussion & exercises)*  
Readings: EFH, Chapter 6; JA&R #4 (Blando)  
HMWK 6 due

Thu July 31  
*Exposure to physical agents*  
Readings: JA&R #5 (Laitinen), JA&R #6 (FAA)

Tue Aug 5  
*Physical exposures (Discussion & exercises)*  
Readings: JA&R #7 (ICNIRP), JA&R #8 (BCWCB)  
HMWK 7 due

Thu Aug 7  
*Microbiological Exposures*  
Readings: JA&R #9 (Pasanen), JA&R #10 (Delignette)  
Paper due by 8:00 am on August 8.

## **Class Policies**

**Class Attendance:** You are expected to attend every class and to be prepared on the readings for that day. Personal issues will be handled on an individual basis.

**Make up exams and deadlines:** If you anticipate a reason why you cannot be present for the midterm exam, inform the instructor in advance. Homework turned in past the deadline will be accepted and may be graded, but will receive no credit. Late papers will not be accepted.

### **Academic Integrity**

Students are expected to act in accordance with the University of Florida policy on academic integrity (see Student Conduct Code, the Graduate Student Handbook or this website for more details: [www.dso.ufl.edu/judicial/procedures/academicguide.php](http://www.dso.ufl.edu/judicial/procedures/academicguide.php)). Cheating, lying, misrepresentation or plagiarism in any form is unacceptable and inexcusable behavior. Incidents will be reported directly to the Office of Student Judicial Affairs and a formal procedure will be started in each and every case. There will be no informal incident resolution between student and instructor. Should you have any doubts on whether something constitutes plagiarism, consult the many available resources on the topic, or consult the instructor in advance.

*We, the members of the University of Florida community,  
Pledge to hold ourselves and our peers  
To the highest standards of honesty and integrity*

Unless specifically indicated, all assignments are individual. You may discuss the assignment and exchange tips with your classmates - and are even encouraged to - but under no circumstances should the assignments be the work of a study group. Breach of this policy will be considered a form of plagiarism and dealt with according to university policy. As a rule of thumb, yours can no longer be considered an individual work, if :

- a) you look at someone else's work, at any time or in any form. OR
- b) you exchange information while both you and a classmate are simultaneously working on the same assignment.

### **Accommodations for students with disabilities**

If you require classroom accommodations because of a disability, you must first register with the Dean of Students Office (<http://oss.ufl.edu/>). The Dean of Students Office will provide documentation to you, which you then give to the instructor when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework.

### **Counseling and Student Health**

Students may occasionally have personal issues that arise in the course of pursuing higher education or that may interfere with their academic performance. If you find yourself

facing problems affecting your coursework, you are encouraged to talk with an instructor and to seek confidential assistance at the University of Florida Counseling Center, 352-392-1575, or Student Mental Health Services, 352-392-1171. Visit their web sites for more information:

<http://www.counsel.ufl.edu/> or <http://www.health.ufl.edu/shcc/smhs/index.htm#urgent>

The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services, including primary care, women's health care, immunizations, mental health care, and pharmacy services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out their web site at [www.health.ufl.edu/shcc](http://www.health.ufl.edu/shcc)

Crisis intervention is always available 24/7 from:  
Alachua County Crisis Center: 352-264-6789

BUT do not wait until you reach a crisis to come in and talk with them. They have helped many students through stressful situations impacting their academic performance. You are not alone, so do not be afraid to ask for assistance.

### **Expected Class Demeanor**

You are expected to maintain a civil tone and respect the opinions of others during class discussions and oral quizzes. While commenting on others' statements is encouraged, aggressive or patronizing language is unacceptable.

Please silence any electronic devices; if you must respond to a call, quietly excuse yourself out of the classroom.