**OEH:6460 Quantitative Exposure Assessment**

Spring xxxx

Tuesdays and Thursdays 2:30 – 3:50

CPHB xxxx

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**Description**

Students will understand the fundamental concepts and methods to design occupational and environmental exposure assessment studies, analyze exposure data, interpret the results of data analyses, and link exposure data to health outcome data. The course addresses the principles of quality control of exposure data collection, exposure assessment, and interpretation of data to determine occupational and environmental disease risks and to guide intervention efforts. The course also covers study planning, survey techniques, risk assessment, and hazard communication.

Upon successful completion of this course, the student will be able to:

(1) Explain the fundamental concepts and methods of collecting and analyzing occupational and environmental exposure data;

(2) Design exposure assessment field and laboratory studies and analyze data collected in those studies;

(3) Evaluate the quality of exposure data and characterize data distributions;

(4) Interpret the results of exposure assessment analyses and factors that determine the variability within the data distributions; and

(5) Characterize the potential exposures of populations to hazardous agents and use this data to guide intervention efforts.

**Goals**

Students will understand fundamental concepts and methods to summarize exposure data, evaluate their distributions, and interpret the results in order to make decisions on the results. At this time, classroom examples will focus primarily on *occupational exposure data sets*.

**Requirements**

1. Classes will consist of lectures and discussions of the assigned readings. *Students will be responsible for preparing for each class by completing the reading assignments and completing any assigned homework*. Students will be responsible for attending class and participating in class discussions.

2. Materials, including data sets and spread sheets, will be posted on ICON. Contact hours in class will devote time to performing and interpreting analyses, which requires students to prepare personal computers prior to class meetings. Specific notes on computer setup will be provided on ICON. Students will present homework analyses and interpret data analyses from literature in class. These activities account for 15% of the grade.

3***. Exam 1 (take home)*** requires students is a practical exam where students apply analyses discussed in class to data set(s) to demonstrate a basic understanding of concepts in the class.

4. The semester-long ***project*** requires students to work with a set of data and, while using at least three techniques from the class, submit a report (in the style of a manuscript) to the analysis of this data set. With approval from your research advisor, you may use data from your current research projects. Alternatively, we have identified OEH faculty who have data sets appropriate for the completion of this project. See the “recommended timeline” posted on ICON for managing your workload to successfully complete this project. Throughout the semester, students will provide progress updates (in class) for their project, with a final summary presentation at the end of the semester.

**Additional required readings/websites:**

Additional articles will be posted on ICON for reading on specific topics throughout the semester to assist with understanding of the course materials. Students are expected to read and be ready to discuss these articles in classes.

**Grades**

Grades will be determined as follows:

* **One** take home examination (application of methods and interpretations covered in class)—35%
* **One** final manuscript/report for data assessment project --50%
* **In-class** participation, including project updates (see schedule) and contributions to hands-on data analysis/interpretation of case studies – 15% (10% homework / literature review presentations, 5% project progress presentations)

Standard letter grades will be assigned, using:  
A = 90 -100%, B=80-89%, C=70-79%, D=60-69%, F=<60%

**Housekeeping –**

**Administrative Home**

This course is given by the College of Public Health. This means that class policies on matters such as requirements, grading, and sanctions for academic dishonesty are governed by the College of Public Health. Students wishing to add or drop this course after the official deadline must receive the approval of the Associate Dean for Academic and Student Affairs in the College of Public Health. Details of the University policy of cross enrollments may be found at: http://www.uiowa.edu/~provost/deos/crossenroll.doc

**Electronic Communication**

*University policy specifies that students are responsible for all official correspondences sent to their standard University of Iowa e-mail address (@uiowa.edu). Students should check this account frequently.*

**Availability of Accommodations for Students with Disabilities**

*Any student eligible for and needing academic adjustments or accommodations under the Americans with Disabilities Act is requested to notify the instructor as soon as possible to make appropriate arrangements.*

http://www.uiowa.edu/~sds/accommodations-services/index.html .

**Academic Misconduct**

Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Education and Student Affairs. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. **It is the student’s responsibility to seek clarification of any situation in which he/she is uncertain whether plagiarism is/has been involved. Students who are uncertain about what constitutes plagiarism should consult with the course instructor.** Students are expected to abide by the University of Iowa Code of Student Life, which clearly defines academic misconduct (1.1a), found at: <http://www.uiowa.edu/~our/opmanual/iv/01.htm>

*Academic Misconduct includes but is not limited to the following:*

* *presentation of ideas of others without credit to the source;*
* *use of direct quotations without quotation marks and without credit to the source;*
* *paraphrasing without credit to the source;*
* *participation in a group project which presents plagiarized materials;*
* *failure to provide adequate citation for material obtained through electronic research;*
* *downloading and submitting work from electronic databases without citation;*
* *submitting material created/written by someone else as one’s own, including purchased term/research*
* *papers;*
* *copying from someone else’s exam, homework, or laboratory work*
* *allowing someone to copy or submit one’s work as his/her own;*
* *accepting credit for a group project without doing one’s share;*
* *submitting the same paper in more than one course without the knowledge and approval of the instructors involved;*
* *using notes or other materials during a test or exam without authorization;*
* *not following the guidelines specified by the instructor for a “take-home” test or exam.*

**Classroom Behavior**:

**General:** The ability to learn is lessened when students engage in inappropriate classroom behavior, distracting others; such behaviors are a violation of the Code of Student Life (http://studentservices.

uiowa.edu/students/policies/2a.php )

**Cell Phones & Pagers:** Set cell phones and pagers on vibrate prior to entering class. Do not speak on the phone in class. Leave the room if you must speak with someone.

**Concerns about Faculty Actions**

Students who believe they have been subjected to unfair treatment in the administration of academic policies may seek resolution of their complaints through the College of Public Health, as explained in Chapter XI (Student’s Policies and Procedures) found at: http://www.public-health.uiowa.edu/faculty-staff/faculty/handbook/pdf//Chapter\_XI.pdf *Students who have a concern about a faculty action should first address the issue with the instructor, then the course supervisor (if there is one), and then the departmental DEO (Peter Thorne). Students may also contact the Associate Dean for Education and Student Affairs in the College of Public Health. Another resource for students is*

*the Office of the University Ombudsperson. If a complaint cannot be resolved at the departmental and/or collegiate level, students may file a formal complaint utilizing the procedure specified in the (II-29.7), found at* http://www.uiowa.edu/~our/opmanual/ii/29.htm *.*

**Nondiscrimination Statement**

The University of Iowa prohibits discrimination in employment, educational programs, and activities on the basis of race, national origin, color, creed, religion, sex, age, disability, veteran status, sexual orientation, gender identity, or associational preference. The University also affirms its commitment to providing equal opportunities and equal access to University facilities. For additional information on nondiscrimination policies, contact the Office of Equal Opportunity and Diversity, (319) 335-0705.

**Understanding Sexual Harassment**

*Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment (*http://www.uiowa.edu/~eod/policies/sexual-harassment-guide/index.html)*for assistance, definitions, and the full University policy.*

**Reacting Safely to Severe Weather**

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety web site: *visit http://hawkalert.uiowa.edu/*

Preliminary Syllabus – Quantitative Exposure Assessment

Course Schedule

Date Topic

1/20 **Course introduction and General Concepts (TRA)**

* 1. Outline exposure/risk paradigm
  2. Impact of exposure assessment goal on strategy
  3. Review of key exposure assessment terminology

1/22-2/10 **Module 1: Descriptive Statistics and Data Distributions (TRA)**

1. Understanding your data: sorting, graphing, and digging in
2. Working with software: Excel, SAS, and other techniques
3. Normality testing: why, how, what to do if problem
4. Censored data: how to deal with the detection limit
5. How and when to write a hypothesis: nail it down early
6. Data Quality: what do you do with data that don’t pass QC, outliers, and other real world issues

2/12 ***Literature Discussion:*** Report on articles using terms from this module

2/17 ***Homework Set #1:*** *Descriptive Statistics*

2/19 ***Student Presentations*** – Discuss data, hypotheses, descriptive statistics

2/24-3/12 **Module 2: Testing your data** (TRA / TP)

1. Similar Exposure Groups - Setting criteria
2. Analysis of variance: Three Models
   1. SEG: Fixed mean, random deviation
   2. One-way Random Effects (fixed mean, random person effects, random deviation)
   3. Mixed Model: (fixed mean, fixed group, random person, random w/in worker deviation)
3. Fitting models with exposure determinants

3/10 ***Literature Discussion:*** Report on articles using terms from this module (SEG / ANOVA / Between-within variance)

3/12***Homework Set 2:*** *Testing data*

3/15-22 *Spring break, no classes*

3/24-26 **Uncertainty and Variability: Monte Carlo Techniques (TRA)…** *end of Module 2*

1. How to address uncertainty in exposure estimates
2. Overview of Monte Carlo process
3. Application of Monte Carlo to concentration estimates (well-mixed room)
4. Documenting assumptions and limitations

3/31-4/2***Take Home Exam (available on ICON 3/29 at 8 am; due 3/29 by 5 pm)*** – no in class meeting this week

4/7- 23 **Module 3:** **Incorporating Exposure Assessments into Risk Assessments (RA)**

1. Basic risk assessment models
2. How exposure assessment fits into the model
3. Use of Monte Carlo techniques into risk assessments
4. Incorporating into prioritization or strategy development
5. Microbiological risk assessment **(Kelly Baker)**

4/21 ***Literature Discussion:*** Report on risk assessment articles

4/23***Homework Set 3:*** *Risk Assessment*

4/28,30 ***Student Presentations*** – Final findings (solicit comments for your final report)

5/5-7 **Special Case Studies (Guests)**

1. Linking exposure data to GIS databases
2. Processing satellite data for environmental assessments

***Final Project:***

Turn-in on ICON by 5/7/15 at 5 pm.