Summary

People come into contact with many potentially hazardous chemical, biological, and physical agents in the home, work, and outdoor environments. Exposure is a quantitative measure of the contact between a person and a potentially hazardous agent. In this course, students will learn how to recognize potential exposures in a variety of settings and how to evaluate those exposures. Class sessions will be in a traditional lecture format. Course grades will be based on written responses to the readings assigned for each class session, homework assignments, and a written group report on human exposure to one of a variety of agents of interest.

Course Information

Tuesdays & Thursdays (September 8, 2009 – October 22, 2009), 5:45 – 7:40 PM
Mayo A-110
2 credits

Instructor Information

Lead Instructors:
Pete Raynor, Ph.D., Assistant Professor, Division of Environmental Health Sciences
Office: Mayo 1230  Office hours: By appointment
Office phone: (612) 625-7135  Email: praynor@umn.edu

Gurumurthy Ramachandran, Ph.D., Professor, Division of Environmental Health Sciences
Office: Mayo 1205  Office hours: By appointment
Office phone: (612) 626-5428  Email: ramac002@umn.edu

Additional Instruction:
Craig Hedberg, Ph.D., Professor, Division of Environmental Health Sciences
Office phone: (612) 626-4757  Email: hedbe005@umn.edu

Lisa Peterson, Ph.D., Professor, Division of Environmental Health Sciences
Office phone: (612) 626-0164  Email: peter431@umn.edu

Matt Simcik, Ph.D., Associate Professor, Division of Environmental Health Sciences
Office phone: (612) 626-6269  Email: msimcik@umn.edu

Nimi Singh, M.D., M.P.H., Assistant Professor, Department of Pediatrics
Office phone: (612) 625-5497  Email: singh031@umn.edu
Course Objectives

By the end of the course, students should be able to:

- explain what is meant by "environmental health"
- define "exposure" and related terms in context of the environmental health paradigm
- recognize human exposures to potentially harmful agents in a variety of settings (home, work, outdoors) and a variety of media (air, water, food)
- recommend approaches for evaluating human exposures to potentially harmful agents
- identify potential strategies for limiting exposures to harmful agents
- explain similarities and differences in exposure concepts across disciplinary boundaries in environmental health
- apply the knowledge they develop to real-world exposures to harmful agents
- describe what has been learned through effective written communication

Course Materials

There is no text for this course. Assigned readings will be either web-based or PDF files. Reading assignments will be required for each class session. They will be posted on the course's WebVista site, which can be accessed through http://www.myu.umn.edu.

Assignments

Written Responses to Readings
The course will include short written responses to the assigned readings for each class session. The reading assignments and the requirements for the written responses will be posted for each class session at least 1 week before the session on the course WebVista site. These assignments will be "handed in" by posting them to the WebVista site by 5:30 PM on the day of the session. Each response will each be graded on a 3-point scale. Your 10 best grades among the 13 response assignments will be incorporated into your final grade. Students may discuss these written responses together, but each student should write their own response and post it individually to the course web site.

Homework
Three homework assignments will be included as part of the course. These assignments, due in the hands or mailbox of Dr. Raynor or Dr. Ramachandran on the dates indicated on the course schedule, will each be graded on a 100-point scale. The assignments will be posted on the course web site at least 1 week before they are due. Grades will be reduced by 10 points for each weekday that the assignment is late. Students may work together on homework assignments. However, each student should submit her/his own assignment for grading.

Group Project
Students will be required to work in groups of 3-4 to write a group paper that explores information on different aspects of exposure to a potentially-hazardous environmental agent. From a list of potential agents provided by the instructors, students will be asked to indicate their top 4 preferences. With that information, the instructors will assign students to a group. Each group will work together on researching the topic, assembling the information, and writing their
completed papers will be posted on the Division of Environmental Health Sciences web site with full attribution to the student authors.

The papers should be 15-20 pages long, not including the title page, table of contents, and references. The font should be Times New Roman, 12-point, single-spaced. Margins should be 1-inch wide on the top, bottom, and sides. The paper should include the following elements:

1. Title page, including course number and author names (not included in page count)
2. Table of contents (not included in page count)
3. Characteristics of the agent
4. Sources of the agent
5. Fate and transport of the agent in various environments
6. Routes of human exposure (inhalation, ingestion, dermal, etc…)
7. Reasons for concern about human exposure to the agent
8. Methods for measuring human exposure to the agent
9. Strategies for limiting human exposure to the agent
10. References (not included in page count)

Groups should be sure to discuss controversies about scientific aspects of exposure to their agents within this structure. As many as 12 figures may be inserted into the document. The typical figure should not take up more than ¼ of a page. Figures should be numbered in order and include a caption. Readers should be directed to each figure by number at an appropriate location in the text. Any figures taken from other documents MUST be properly referenced. You MUST also properly reference all ideas that you draw from literature sources. Failure to attribute ideas you use to their sources is a form of plagiarism. For guidance on properly referencing your sources, see http://www.writing.umn.edu/sws/quicktips/online_resources.htm.

The papers are due in the hands or mailbox of Dr. Raynor or Dr. Ramachandran on Monday, October 26, 2009. Grades will be based on content (70%), sufficient and proper use of scientific references (20%), and writing and formatting style (10%). Grades will be reduced 10% for each weekday that the paper is late. All members of the group will receive the same grade.

Course Grading

For all assignments, partial credit will be awarded generously. In addition, the neatness of the work is important because the instructor will be able to follow the students' reasoning more easily when trying to award partial credit.

The breakdown of grading for the course is:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading responses</td>
<td>30%</td>
</tr>
<tr>
<td>Homework assignments</td>
<td>30%</td>
</tr>
<tr>
<td>Group project</td>
<td>40%</td>
</tr>
</tbody>
</table>

Final grades will be assigned on an A/F basis as follows:
A (93-100 %) Outstanding achievement relative to course expectations
A− (90-93 %)
B+ (87-90 %)
B (83-87 %) Achievement above minimum course expectations
B− (80-83 %)
C+ (77-80 %)
C (73-77 %) Achievement meeting the minimum course expectations
C− (70-73 %)
D+ (67-70 %)
D (60-67 %) Achievement below minimum expectations, but sufficient for credit
F (< 60 %) No credit awarded

The instructors reserve the right to modify this grading structure to the advantage of the students should the minimum course expectations prove to be too ambitious.

**What the Instructors Expect from Students**

- Students are expected to attend all classes and to arrive on time.
- Students will download handouts and assignments from the course's WebVista site that can be accessed through [http://www.myu.umn.edu](http://www.myu.umn.edu).
- Students are expected to complete the reading assignments prior to class.
- Students are expected to be aware of current events as they relate to environmental health and exposure to potentially hazardous agents.
- Students are expected to answer questions posed by the instructors and participate in classroom discussions.
- Students are responsible for asking questions and/or letting instructors know when they do not understand lectures or course materials.
- Students are expected to turn assignments in on time.
- Although students may discuss the readings as they prepare their responses and may work together on homework assignments, each student should turn in a separate assignment.
- Each member of a group project team is expected to participate to approximately the same extent as the other members of the team.
- Students are expected to utilize the University of Minnesota Libraries as necessary, either online or in person.
- Students are encouraged to provide constructive feedback to the instructors when they are dissatisfied with the course content or teaching methods.

**What Students Should Expect from the Instructors**

- The instructors will be enthusiastic about the class and the subject matter.
- The instructors will post reading assignments on the course's WebVista site more than 1 week before the class session.
- The instructors will post homework assignments on the course's WebVista site more than 1 week before they are due.
• The instructors will post lecture slides on the course's WebVista site more than 24 hours before class time.
• The instructors will make the objectives clear for each day's session at the beginning of the session.
• The instructors will begin and conclude classes on time.
• The instructors will take a 5-10 minute break about halfway through each class session.
• The instructors will answer all questions posed during class by students. Whenever possible, questions will be answered immediately. As an alternative, an instructor may indicate that the question will be addressed later in the class or that he will answer the question at the beginning of the next lecture if he does not know the answer.
• The instructors will ensure that all discussions in class are conducted in a professional and collegial manner.
• The instructors will create assignments with clear expectations.
• The instructors will grade and return assignments within one week of submission.
• The instructors will grade assignments objectively on criteria shared with the students in advance.
• The instructors will provide feedback on assignments that identifies both strengths and weaknesses in student work with constructive suggestions for improvement.
• The instructors will make themselves available outside of class to discuss any aspect of the course with students.
• The instructors will differentiate between facts and their opinions during their lessons.

Additional Information

Every class is influenced by the fact that participants bring diverse values, experiences, and abilities into the classroom. All participants will be expected to listen to those with differing views, disagreeing with the views while remaining respectful of the individuals who hold them. Students should feel free to question the instructors and each other collegially at any time.

School of Public Health students may withdraw from a course through the second week of the semester without permission. No "W" will appear on the transcript. After the second week students are required to do the following:

• The student must contact and notify their advisor and course instructor informing them of the decision to withdraw from the course.
• The student must send an e-mail to the SPH Student Services Center (SSC). The email must provide the student name, ID#, course number, section number, semester and year with instructions to withdraw the student from the course, and acknowledgement that the instructor and advisor have been contacted.
• The advisor and instructor must email the SSC acknowledging the student is canceling the course. All parties must be notified of the student’s intent.
• The SSC will complete the process by withdrawing the student from the course after receiving all emails (student, advisor, and instructor). A "W" will be placed and remain on the student transcript for the course.

After discussion with their advisor and notification to the instructor, students may withdraw up until the eighth week of the semester. There is no appeal process.
An incomplete grade is permitted only in cases of extraordinary circumstances and following consultation with the instructor. In such cases an "I" grade will require a specific written agreement between the instructor and student specifying the time and manner in which the student will complete the course requirements. Extension for completion of the work will not exceed one year.

Students are responsible for knowing the University of Minnesota, Board of Regents' policy on Student Conduct and Sexual Harassment found at [http://www1.umn.edu/regents/polindex.html](http://www1.umn.edu/regents/polindex.html).

Scholastic dishonesty as defined in the policy and will be reported to the Office for Student Conduct and Academic Integrity ([http://www1.umn.edu/oscai/index.html](http://www1.umn.edu/oscai/index.html)) and will result in a grade of "F" or "N" for the entire course. Plagiarism is an important element of this policy. It is defined as the presentation of another's writing or ideas as your own. Serious, intentional plagiarism will result in a grade of "F" or "N" for the entire course. For more information on this policy and for a helpful discussion of preventing plagiarism, please consult University policies and procedures regarding academic integrity: [http://www.writing.umn.edu/sws/quicktips/online_resources.htm](http://www.writing.umn.edu/sws/quicktips/online_resources.htm). Students are urged to be careful that they properly attribute and cite others' work in their own writing. For guidelines for correctly citing sources, go to [http://tutorial.lib.umn.edu/](http://tutorial.lib.umn.edu/) and click on "Citing Sources". In addition, original work is expected in this course. It is unacceptable to hand in assignments for this course for which you receive credit in another course unless by prior agreement with the instructor. Building on a line of work begun in another course or leading to a thesis, dissertation, or final project is acceptable. If you have any questions, consult the instructor.

Any student with a documented disability (e.g., physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the instructor and Disability Services at the beginning of the semester. All discussions will remain confidential. For further information contact the University of Minnesota Disability Services website at [http://ds.umn.edu/](http://ds.umn.edu/) or call (612) 626-1333 (V/TTY). Disability Services is located in Suite 180 McNamara Alumni Center, 200 Oak Street.
COURSE SCHEDULE

9/8/09  Session 1  **Course Introduction**  
Speakers: Pete Raynor, Gurumurthy Ramachandran

9/10/09  Session 2  **Basic Concepts of Exposure**  
Speaker: Gurumurthy Ramachandran

9/15/09  Session 3  **Recognizing Exposures: Hazards in the Home**  
Speaker: Gurumurthy Ramachandran

9/17/09  Session 4  **Recognizing Exposures: Hazards at Work**  
Speaker: Pete Raynor

9/22/09  Session 5  **Recognizing Exposures: Air Pollutants**  
Speaker: Pete Raynor

9/24/09  Session 6  **Recognizing Exposures: Global Climate Change**  
Speaker: Pete Raynor  
**HOMEWORK #1 DUE**

9/29/09  Session 7  **Recognizing Exposures: Water Pollutants**  
Speaker: Pete Raynor

10/1/09  Session 8  **Recognizing Exposures: Hazards to the Food Supply**  
Speaker: Craig Hedberg

10/6/09  Session 9  **Evaluating Exposures: Microorganisms**  
Speaker: Craig Hedberg

10/8/09  Session 10  **Evaluating Exposures: Modeling of Exposures**  
Speaker: Gurumurthy Ramachandran  
**HOMEWORK #2 DUE**

10/13/09  Session 11  **Evaluating Exposures: Chemicals**  
Speaker: Matt Simcik

10/15/09  Session 12  **Special Exposure Topic: Endocrine Disruptors**  
Speaker: Nimi Singh

10/20/09  Session 13  **Evaluating Exposures: Biomarkers as Measures of Exposure**  
Speaker: Lisa Peterson

10/22/09  Session 14  **Limiting Exposures**  
Speaker: Pete Raynor  
**HOMEWORK #3 DUE**

10/26/09  **GROUP PAPERS DUE**