

COURSE SYLLABUS

OEH 6553 OCCUPATIONAL AND ENVIRONMENTAL TOXICOLOGY

Semester:	Spring 2017
Credit hours:	3 credits
Class Hours:	Hybrid: Thursday, 3-6 pm (in-class)
Class Location:	Hybrid: online/CHB 437
Instructors:	Jun Wang, Ph.D.
Office:	CHB 425
Telephone:	(405)271-2070 ext. 46767
Email:	Jun-Wang@ouhsc.edu
Office Hours:	By appointment, call or email

Course Description

The purpose of this course is to introduce the fundamental and critique aspects of toxicology and its applications in both general environment and workplaces. The course is designed to provide the students with the concepts of toxicology terminologies, toxicokinetics, metabolism mechanisms, carcinogenesis, and systematical toxicity. The course also covers the basics of human health and ecological risk assessment. The focus of the course will be on using the knowledge to understand the health effects of exposing to toxic substances that the students will encounter in the future career as an industrial hygienist or an environmental health professional.

Prerequisites

OEH 5013 Environmental Health (or equivalent core course).

Background in organic chemistry, biochemistry, and biology preferred but not mandatory. Special enrollment permission can be requested from Dr. Wang.

Course Learning Objectives

Upon completion of the course, students should be able to:

1. Be familiar with the basic concepts and terminologies in the field of toxicology.
2. Describe the relevance of chemical and biological properties of toxicants to human health, and explain the biotransformation process of specific chemical agents.
3. Detail the molecular, cellular, organ and system responses resulting from exposure in the general and occupational environment.
4. Understand the principles behind human health risk models, and apply to different exposure scenarios.
5. Appreciate the current issues, outbreaks, and research topics related to toxic substances in the environment.
6. Identify the major toxicological knowledge database and sources for the industrial hygienist and environmental health professionals.

Conduct of the Course

This class is in the format of hybrid online/in-class. All students are required to review the requirements and be responsible for completing the task on time. The lectures, assigned readings, and pre-class and post-class quizzes will be posted on D2L as course progressing. Students are encouraged to post comments, suggestions, and discussions on D2L.

Required Textbook:

Casarett & Doull's Essentials of Toxicology, 2nd Edition

by Curtis Klaassen, John B. Watkins III

ISBN-13: 978-0071622400 ISBN-10: 0071622403

Students are required to read the corresponding chapters as outlined in the course schedule.

Lectures, quizzes, and exams

The first half of the semester consists of one introductory in-class lecture, and seven online lectures. They are focusing on the general concepts and basic principles of toxicology, with some emphasis on their applications in the environment and workplaces. Each online lecture has two quizzes that students need to finish. An **in-class closed-book exam** (15%) will be administered the week after the Spring break.

The second half of the semester will focus on individual organ/system toxicity. The classes during the second half of the semester will be a combined textbook reading, literature review, and short lecture videos. Towards the end of the semester, there will be another **in-class exam** (15%) covering the second half of the semester, and it is open-book.

The pre-class quizzes are typically 5-10 long-answer questions without time limit, and should be done after assigned readings but before the lecture. The post-class quizzes are generally 20 multi-select questions with a time limit of 20 minutes, and should be done after the lecture.

Final report and presentation

Students have to choose a topic for their final report. The **final report** should be related to a certain toxicant in the occupational and environmental health field, the toxicant's emission sources, route of exposure, known/suspected human health effects. It should be primarily a literature review with **no more than 20 pages** (double-spaced). The report should be formatted to APA style with at least 20 references. The student will also need to emphasize the knowledge they learn from the class. EPA IRIS, ATSDR, Pubmed are some good places to begin with. The grading rubrics can be accessed from D2L. The **final report** (30%) is due on the day of the exam.

Students need to get the **approval of the topic selection** from Dr. Wang on/before **3/23**. Each student's topic should be unique to others, so the topic pool is on a first come first served basis. Some examples of previous students' topic selections are available upon request. The topics, once approved, will be posted to D2L frontpage.

Students also need to present their final report as a **30 minutes in-class podium talk** on 5/4. Students should send the presentation files and handouts (if any) to Dr. Wang **one week** prior to the presentation so that they can be posted online for other students. The grades of the presentations will come from peer assessment (other students). The peer evaluation sheet is available on D2L and will be disseminated prior to the presentation.

Make-up exam, late submission, and attendance policy

A **make-up exam** (within a week of the original exam) is available if the student has an emergency prohibits him/her attending the exam. **Extension of deadline** for the final report due to difficult life circumstances is allowed. In this case, an "I" will be assigned to the student's record. The "I" will be removed once Dr. Wang receives the final report (no later than June 30th). The grade of late submission students will be downgraded by one letter (If your final score is A, then you will receive B).

Although this course is primarily conducted online, students are required to show up during the in-class sessions (outlined in the course schedule).

Method of Evaluation and Grading

Grades will be based on the following:

1. Pre-class quizzes (online): 16%
2. Post-class quizzes (online): 24%
3. Exam 1 (closed-book): 15%.
4. Exam 2 (open-book): 15%.
5. Presentation: 10% (peer evaluation)
6. Final report: 20% (grading rubrics)

Letter grades will be assigned as follows:

A: >89.5%; B: 80~89.5%; C: 70~79.5%; D: 60~69.5%; F: <60%.

No curve to the final grade, however, exceptional attendance, participation, and the demonstration of a mature scholarly interest will be used to bump "borderline" students to the higher grade. Dr. Wang reserves the right to determine what constitutes a borderline case.

Course Materials

Required Textbook:

Casarett & Doull's Essentials of Toxicology, 2nd Edition
by Curtis Klaassen, John B. Watkins III
ISBN-13: 978-0071622400 ISBN-10: 0071622403

You can also opt to use *Casarett & Doull's Toxicology: The Basic Science of Poisons, 8th Edition*, as a textbook, if you feel toxicology will be an important part of your future life.

Online Resources:

TOXNET	http://toxnet.nlm.nih.gov/
ATSDR	http://www.atsdr.cdc.gov/
PUBMED	http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed
TOXTOWN	http://www.toxtown.nlm.nih.gov
CDC	http://www.cdc.gov/exposurereport
IRIS	http://www.epa.gov/iris/

Current Toxicology News:

There is a discussion section on the D2L site. Students are encouraged to discuss the current news in the general toxicology and environment, and may bring up their story pieces and viewpoints. Active participants in the discussion will be favored for the "borderline" bump.

Course Schedule

Date*	Topics	Textbook chapters	Pre-class Quiz (16%)	Post-class Quiz (24%)
First half of the semester: general toxicology principles				
1/19 3-4 pm	Course overview	N.A.		
Online	Introduction to toxicology Human health risk assessment	1, 2, 4	1	1
Online	Toxicokinetics & Toxicodynamics I: <i>absorption, distribution and excretion</i>	5, 7	2	2
Online	Toxicokinetics & Toxicodynamics II: <i>toxicity mechanism</i>	3	3	3
Online	Xenobiotic biotransformation I: <i>phase I and phase II</i>	6	4	4
Online	Xenobiotic biotransformation II <i>bioactivation and application</i>	6	5	5
Online	Environmental carcinogenesis biomarkers	8, 9	6	6
Online	Common environmental toxicants	22-27	7	7
Spring break week no class				
3/23 3-6 pm	Exam 1 (15%) , final report topic due			
Second half of the semester: system toxicity & literature study				
Online	Occupational toxicology	33	8	8
Online	Pulmonary, dermal, ocular/visual toxicity	15, 19, 17	N.A.	9
Online	Hepto-, renal-, and neuro-toxicity	13, 14, 16		10
Online	Immune, endocrine, reproductive toxicity	12, 21, 20		11
Online	Blood and cardiovascular toxicity	11, 18		12
5/4 3-6 pm	Student Presentation (10%)	N.A.		
5/11 3-6 pm	Exam 2 (15%) , final report due (20%)			

Course Policy Statements

This syllabus is intended as a guide for this course. Dates, assignments, and evaluation are subject to revision by the instructor. Any such revisions will be announced in advance.

Copyright. This syllabus and all related course material are protected under US Copyright Law and may not be further disseminated in any form or format without the prior explicit written consent of the faculty member. Failure to comply with this provision may subject the student to disciplinary action and/or state or federal action.

Student Professional Behavior in an Academic Program. Ethical and professional behaviors are considered a core competency in an academic program and, thus are key factors in good academic standing. Upon acceptance of an offer of admission, the student commits to comply with all professional conduct regulations established by the University, respective college, and program. The complete University policy is at www.ouhsc.edu/provost/documents/FacultyHandbookOUHSC.pdf

Academic Misconduct Code. The code describes academic misconduct as acts intended to improperly affect the evaluation of a student's academic performance or achievement and includes but is not limited to acts such as cheating, plagiarism, fabrication, fraud, destruction, bribery or intimidation, assisting others in any act proscribed by this Code, or attempting to engage in such acts. The policy and procedures related to academic misconduct are detailed in the Academic Misconduct Code found in Appendix C of the Faculty Handbook at www.ouhsc.edu/provost/documents/FacultyHandbookOUHSC.pdf

Academic Appeals. This policy outlines the procedure to request a hearing for appeals related to evaluation in a course, thesis or dissertation defense, general or comprehensive exam. It also outlines the appeal process for a suspension or dismissal or under the Student Professional Behavior in an Academic Program Policy, and the appeal of decisions resulting in dismissal, expulsion, or suspension from a program. The sole basis for an academic appeal is an alleged prejudiced or capricious evaluation or decision. Policy and procedure details are in Appendix C of the Faculty Handbook at www.ouhsc.edu/provost/documents/FacultyHandbookOUHSC.pdf

Accommodation on the Basis of Disability. The University of Oklahoma is committed to the goal of achieving equal educational opportunity and full participation for students with disabilities. Accommodations on the basis of disability are available by contacting the Disability Resource Center (DRC) by email at drc@ou.edu. or by calling (405) 325-3852 or Voice or (405) 325-4173/TDD. Information on policies and registration with the Disability Resource Center may be found on the DRC website at: www.ou.edu/drc. Students requesting accommodations related to work in a course must contact the DRC as soon as possible; accommodations are not made retroactively.

Sexual Misconduct. For concerns regarding gender-based discrimination, sexual harassment, sexual misconduct, stalking, or intimate partner violence, the University

offers a variety of resources, including Advocates-On-Call 24/7, counseling services, mutual “No Contact orders,” scheduling adjustments, and disciplinary sanctions against the perpetrator. Please contact the Sexual Misconduct Office at (405) 325-2215 (8AM-5PM) or the Sexual Assault Response Team at (405) 605-0013 (24/7).

Adjustment for Pregnancy/Childbirth Related Issues. Students needing modifications or adjustments to course requirements because of documented pregnancy-related or childbirth-related issues should contact the college’s Assistant/Associate Dean for Student Affairs (or academic advisor) as soon as possible to discuss. Generally, modifications will be made where medically necessary and similar in scope to accommodations based on temporary disability. See www.ou.edu/content/eoo/pregnancyfaqs.html for commonly asked questions.

Course Drop/University Withdrawal. The student is responsible to submit required University paperwork before the deadlines shown in the Academic Calendar online at <http://ouhsc.edu/admissions>. Missed homework and examination grades will be entered as a grade of zero if a student fails to formally drop the course or withdraw from the University.

HIPAA Compliance. The University of Oklahoma complies with all federal and state laws related to the confidentiality of patient medical information, including the Privacy and Security Regulations issued pursuant to the Health Insurance Portability and Accountability Act (HIPAA). Students are required to comply with these laws and related University policies and procedures, including the HIPAA Privacy and Security policies (<http://ouhsc.edu/hipaa/policies.asp> and <https://www.ouhsc.edu/compliance/hipaa-security-policy/default.asp>). Students are required to complete the University’s mandatory annual HIPAA training (<http://ouhsc.edu/hipaa/>) and must also comply with the related policies and procedures of their departments and any facilities in which they rotate.

Responsible Conduct of Research. Students, as members of the University community, have the responsibility to ensure that integrity and ethical standards in any activity with which they are associated directly or any activity of which there is sufficient knowledge to determine its appropriateness. Students are governed by the Policy on Ethics in Research (Faculty Handbook Section 3.25) at <http://www.ouhsc.edu/provost/documents/FacultyHandbookOUHSC.pdf>.

Information for students regarding the MPH Core Competency Model

The Council on Education for Public Health (CEPH) has stated in its Accreditation Criteria:

For each degree program and area of specialization within each program identified in the instructional matrix, there shall be clearly stated competencies that guide the development of degree programs. Competencies define what a successful learner should know and be able to do upon completion of a particular program or course of study. These statements describe in measurable terms the knowledge, skills and abilities a successful graduate will demonstrate at the conclusion of the program. The relationship between competencies and learning objectives (the incremental learning experiences at the course and experiential levels that lead to the development of the competencies) should be explicit and aligned with the school’s mission, goals and objectives. Given that competencies define the nature and content of a program and establish explicit student expectations, they should be widely available to students and prospective students, for example, on the school’s website, syllabi and/or in student handbooks. Competencies should guide the curriculum planning process and should be the primary measure against which student achievement is measured.

Specifically, the course will cover the following MPH competencies:

Competencies	Lecture	Exams	Presentation	Final report	Primary/ Reinforce
OEH 1 Explain genetic, physiologic, and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards.	All	Y	Y	Y	P
OEH 3 Utilizes and applies methods and tools for assessing environmental risks.	Online 2		-		P
OEH 5 Explains the general mechanisms of toxicology in eliciting a toxic response to various environmental exposures.	Online 2-8, 10-13		Y		P
OEH 8 Evaluates how biological, chemical and physical agents might affect human health.	Online 7-9		Y		R
OEH 9 Applies biological principles to development and implementation of disease prevention, control, or management programs.	Online 2, 9		-		R

Information for students regarding the ABET outcomes

In addition, the course will cover the following ABET outcomes for M.S. in industrial hygiene/Environmental Health Sciences outcomes:

Outcomes	Lecture	Exams	Presentation	Final report	Primary/ Reinforce
IHGen I: Recognize the need for and ability to engage in life-long learning	All	I & II	-	Y	R
IHSpec A: Identify agents, factors, and stressors generated by and/or associated with defined sources, unit operations, and/or processes	All		-		R
IHSpec C: Demonstrate understanding of physiological and/or toxicological interactions of physical, chemical, biological, and ergonomic agents, factors, and/or stressors with the human body	All		Y		P
IHSpec D: Assess qualitative and quantitative aspects of exposure assessment, dose-response, and risk characterization based on applicable pathways and modes of entry	Week 6		Y		P
IHSpec J: Demonstrate ability to attain recognized professional certification	Week 1, 15		-		R – multiple rubrics