COURSE SYLLABUS
OEH 6683
APPLIED MODELING IN OCCUPATIONAL & ENVIRONMENTAL HEALTH

Semester: Fall 2016
Credit hours: 3 credits
Class Hours: noon-3 pm, Tuesday
Class Location: CHB 437
Instructors: Jun Wang, Ph.D., P.E.
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Office Hours: By appointment, call or email.

Course Description

The purpose of this course is to introduce critical modeling principles and applications used in occupational and environmental health (OEH) research field. Upon completion of the class, students should be able to understand the principles of commonly used quantitative models, select and apply models to assess occupational exposures, environmental quality, and human health risk. Students will also learn the methods to evaluate and validate model data and outcome, as well as use models to support the decision-making process.

Prerequisites

This is an advanced research-oriented course that requiring students to have sufficient science (mathematics, physics, and chemistry) background. Prior to taking the class, student should complete:

OEH 5723 Fundamentals of Occupational and Environmental Health Sciences
OEH 6793 Aerosol Science (or equivalent aerosol course).
Special enrollment permission can be requested from the instructor.

Couse Learning Objectives

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

1. Apply mathematical and intake models to predict occupational exposure.
2. Distinguish and explain the commonly-used types of environmental fate and transport models.
3. Describe pharmacokinetic-based human health risk models.
5. Adapt the principles of modeling and apply the models in the scenarios of occupational and environmental health;
5. Apply the EPA preferred models in air quality and air pollution permitting;
6. Conduct the methods to simulate aerosol formation and assessing health effects of aerosols;
7. Produce graphical depictions from the modeling results and interpret the modeled data;
8. Weigh the role of models in occupational exposure and environmental management decision-making.

Conduct of the Course

The course will consist of 12 classroom lectures and demonstration of the models. Students should preview the lectures from D2L and download the models prior to class. Students should bring their laptop (windows-based preferred) with the models installed to class. All the models discussed in the class will be available to download from D2L.

Students will choose and present on their topic of interest in the form of 6**0 minutes podium presentation** (40%) regarding the specific model/application (background, methodology, result, and discussion, exposure scenarios in environment and workplace). A **final report** (40%) derived from the project is due on the last day of the semester. It should be no more than 10 pages (double-spaced) and formatted to APA style with at least 20 references. Students will also need to emphasize the knowledge they have learned from the class. The grading rubrics can be accessed from D2L.

Method of Evaluation and Grading

Grades will be based on the following:

1. Research project presentation: 40%.
2. Research project paper: 40%.
3. Attendance of class: 20%

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 or bump up to the final grade.

Student Course Evaluations

There will be both a mid-course and an end-of-course electronic evaluation for students to complete. Any responses provided will be anonymous and completely confidential.

Course Materials

No Required Textbook

Handouts will be provided for hardcopies in the classroom and for download in D2L.

Optional Readings

Mathematical Models for Estimating Occupational Exposure to Chemicals, by KB-Charles and CE Simmons
ISBN: 978-1-935082-10-1

Probabilistic Techniques in Exposure Assessment, by AC Cullen and HC Frey
ISBN: 978-0-306-45956-6

Air Dispersion Modeling: Foundations and Applications, by DV Alex
ISBN: 978-1-118-07859-4

Aerosol Technology: Properties, Behavior, and Measurement of Airborne Particles, 2nd Edition, by WC Hinds
ISBN: 978-0-471-19410-1

Reference websites
USEPA preferred model
http://www.epa.gov/scram001/dispersion_prefrec.htm

Course Outline

Date*	Topics	Lecturer	Readings
8/23	Introduction to modeling basics Monte Carlo simulation	JW	Handouts
8/30	Direct-reading: application of Monte Carlo simulation; uncertainty vs sensitivity	JW	Cullen & Frey
9/6	Mathematical models to estimate occupational exposure; numerical vs analytical model	JW	Charles Simmons
9/13	Direct reading: PBPK model overview Applications in diet and airborne exposure	JW	Handouts
9/20	Multi-media pollutant fate and transport models EPA TRIM.FaTE model	JW	EPA website
9/27	Air pollution modeling I: overview, preferred models	JW	Handouts/Alex
10/4	Air pollution modeling II: meteorology and plume	JW	Handouts
10/11	Air pollution modeling III: Gaussian dispersion	JW	Alex
10/18	Air pollution modeling IV: AERSCREEN demonstration	JW	Handouts
10/25	Air pollution modeling V: source apportionment and mass balance model	JW	Handouts
11/1	Direct reading: aerosol mechanism	JW	Hinds
11/9	Aerosol mechanism simulation: the role of inter-coagulation and condensation	JW	Handouts
11/16	Human respiratory deposition models: regional vs full	JW	ICRP publication 66
11/22	Doctoral teaching assignments Direct Reading	JW	N/A
12/6	Research project presentation (40%)	JW	N/A
12/13	**Final report due** (40%)		

* The dates and topics are subject to change, the lecturer will notify students about the change through D2L and email.

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 (HIPPA). 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 Ph.D. Competency Model

The course will cover the following competencies for Ph.D. in occupational and environmental health:

Outcomes	Lecture	Paper	Other	**P**rimary/ **R**einforce
OEH D3 Design studies to test scientific hypotheses or otherwise produce meaningful findings.	All	All		**P**
OEH D4 Use, and if appropriate, develop valid tools to collect and interpret data.	All			**P**
OEH D5 Demonstrate understanding of the chosen area of specialization within occupational and environmental health.	All			**R**