DEPARTMENT: Environmental Health
COURSE NUMBER: EHS 760  SECTION NUMBER: 000  SEMESTER: Spring 2015
CREDIT HOURS: 2
COURSE TITLE: Advanced Risk Assessment

INSTRUCTOR NAME: Owen Devine

INSTRUCTOR CONTACT INFORMATION
EMAIL: owendevine2015@outlook.com (NOTE: DO not use my Emory email!!!!!!)
OFFICE HOURS: By appointment


COURSE DESCRIPTION (3-4 Sentences)
This course provides students with experience in quantitative methods used in environmental health risk assessment. The course will focus on areas such as: types of models used in estimation of health risks, quantification of uncertainties in model-based estimates, use of epidemiologic and other sources of information in the development of risk estimation models and communication of results. The course is taught at a PhD level and assumes familiarity with basic concepts of risk assessment as taught in EH 524.

EVALUATION
Problem Sets: Problems will focus on specific risk estimation concepts and/or techniques and will often require computer driven analyses.

Final Project: A final project will be required. Each student will prepare a presentation and written summary focused on a specific topic illustrating the student’s gained knowledge related to the estimation of environmental health risk. A wide range of latitude will be given on project topics including areas related to the student’s particular research interests.

Grades: The course grade will be based on the following:
   Homework 60%
   Final exam/Project 30%
   Class participation 10%

ACADEMIC HONOR CODE
The RSPH requires that all material submitted by a student in fulfilling his or her academic course of study must be the original work of the student.
LEARNING OBJECTIVES OR COMPETENCIES OF THE COURSE

Students in the course will:

1) Understand the general concepts of environmental health risk assessment including hazard evaluation, environmental transport, risk characterization and risk communication.
2) Gain hands-on experience in the underlying concepts and application of quantitative approaches for environmental health risk assessment.
3) Examine and apply various approaches towards quantifying the uncertainty inherent in environment risk estimation.
4) Understand the complexities of successful inclusion of a wide range of stakeholders in environmental health risk evaluations.

LEARNING OBJECTIVES OR COMPETENCIES FOR THE DEPARTMENT OR PROGRAM TO WHICH THE COURSE CONTRIBUTES

PHD/MPH in Environmental Health

- To learn how environmental and occupational exposures to chemicals, radiation, and other stressors are evaluated in terms of human health risk.
- To understand how to carry out environmental health risk assessment calculations, how to evaluate risk assessments in terms of uncertainties, and how to effectively communicate the risk estimation results.
Advanced Risk Assessment Schedule, Spring 2015

Schedule (subject to change)

Week 1 (1/15)  Syllabus, scheduling and introductions, principles of risk assessment, mathematical models, mass balance equations, overview of uncertainty
Week 2 (1/22)  Overview of modeling concepts, introduction to quantifying uncertainty, stochastic simulation, Monte Carlo (MC) simulation, release assessment
Week 3 (1/29)  Uncertainty in release assessments, MC simulation for uncertainty estimation, constructing uncertainty distributions
Week 4 (2/5)  Modeling environmental transport, Gaussian plume model, uncertainty in environmental transport models
Week 5 (2/12)  Environmental transport models (cont.), exposure estimation, uncertainty propagation using MC methods
Week 6 (2/19)  Exposure estimation (cont.), exposure versus dose, introduction to PBPK modeling
Week 7 (2/26)  PBPK modeling, uncertainty in dose estimation
Week 8 (3/5)  Correlation in uncertain model parameters, propagating correlated uncertainty, introduction to health outcome risk estimation
3/12  Spring Break
Week 9 (3/19)  Guest Lecturer
Week 10 (3/26)  Types of risk estimation models, sources of information for risk model parameters, uncertainty in risk estimation models
Week 11 (4/2)  Estimating uncertainty in complex models, MC algorithms
Week 12 (4/9)  Use of mathematical models in public health, epidemic modeling, model for decision making, decision making under uncertainty. Model-based estimates of exposure/dose in environmental epidemiology
Week 13 (4/16)  Guest Lecturer
Week 14 (4/23)  Misc. Topics
4/30  Final exam/projects