University of Manitoba
Faculty of Environment, Earth and Resources
Department of Environment and Geography

ENVR 4180 Ecotoxicological-Risk Characterization (3 credit hours) A01
GEOG 7010 Ecotoxicological-Risk Characterization (3 credit hours) T01
Term 2, 2015-2016

Instructor: Mark Hanson, Ph.D.
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Office Hours: 9:00am-11am Wednesdays, or preferably, by appointment.

Course Times:
Room 315 Wallace, Tues. and Thurs. 10am-11:15am

Prerequisites:
Introductory Toxicology: Faculty of Environment 2180, Biology 2180 or Agriculture 2180.

Course Materials:
Required
Course notes mandatory, available from instructor for a nominal fee. Other required readings and notes will be distributed in class or via UM Learn.
Recommended
Suter II, G.W. 2006. Ecological Risk Assessment. Lewis Publishers, Boca Raton. (on reserve at the Science Library)

Outline:
A biologically based, advanced course that will give students working knowledge of current processes and techniques for ecotoxicological risk characterization. The course material will cover the topics of problem definition, dose response characterization, exposure characterization, risk assessment, and risk management decision making. The course will be taught in biweekly lectures.

Objectives:
The student will be expected to be able to:
- Define problems in ecotoxicology.
- Understand how to and be able to characterize effects.
- Understand how to and be able to characterize exposure.
- Understand how to and be able to undertake a risk assessment.
- Understand the process of risk management decision-making.
- Apply these principles to a real-life hands-on problem chosen by the student.

Subject materials to be presented:
- Survey the need for and current uses of ecotoxicological-risk assessment.
- Examine and critically assess methods for defining problems in ecotoxicology.

- Review the advantages and disadvantages of methods for measuring dose-response in laboratory and field settings.
- Examine and critically assess the techniques for measuring and predicting exposure.
- Review the techniques for risk assessment and assess the advantages and disadvantages of these.
- Examine approaches and techniques for the management of risks.
- Study several case histories of ecotoxicological-risk characterization and critically assess these in relation to the above.

Grading Scheme:

Assignments	15% (Three assignments worth 5% each)
Term Paper	25%
Midterm Exam	25%
Final Exam	35%
Total	**100%**

Comments:
Policy regarding late assignments: Every student is required to submit all of the assignments. Failure to submit an assignment will result in a mark of zero on that assignment; assignments submitted late will not be accepted without special permission.
Midterm Test: Failure to write the scheduled Midterm Examination without a valid medical certificate or compassionate reason (e.g., death of an immediate family member) will normally result in a mark of zero on that examination. The course instructor reserves the right to reschedule a deferred test for those students who have a valid reason for not writing. Make-up tests will not necessarily follow the same format as the original exam.
Final Examination: All students must write the 3 hour final examination. Failure to write the final examination without a valid medical certificate or compassionate reason (e.g., death of an immediate family member) will result in a mark of zero on the final examination. Deferral of a final examination can only be given by the student's home faculty – the instructor cannot reschedule a final examination.
Evaluative Feedback: Will be provided in the form of the midterm exam and two assignments prior to the voluntary withdrawal deadline date for this course, which is March 18th, 2016.
Final Grade: A total mark of less than 50% in the course will result in a grade of **F**. Marks between 50% and 100% will be graded from **D** to **A+** according to the Department of Environment and Geography grading scheme below:

Letter Grade	**Percentage**
A+	90-100
A	80-89
B+	75-79
B	70-74
C+	65-69
C	60-64
D	50-59
F	<49.9

Computer Lab: All students will need to use the statistical software SigmaPlot and other programs to complete their assignments and term paper. The programs are available in the computer lab in 321 Wallace and you will be given a password to access the machines when they are not scheduled for regular teaching.

Academic Conduct: Students should acquaint themselves with the University's policy on plagiarism and cheating and examination impersonation (see University of Manitoba General Calendar). The copying of another student's assignment (or an instructor's answer sheet from a previous year) or the submission of the same material for two or more courses is plagiarism. Plagiarism and other forms of cheating are prohibited. The full definition of plagiarism and the possible penalties associated with it are outlined in the General Calendar. If your submitted assignment contains material you have copied from another source (e.g., from a textbook, web page, or from the published literature) you must give proper credit to that source.

Schedule and order of material to be covered:

Date	**Lecture Material**	**Assignments/Paper**
Jan. 7th	Introduction/Basic Concepts	
Jan. 12th	The Hazard Quotient Approach	
Jan. 14th	Frameworks for Risk Characterization	
Jan. 19th	Creating a Conceptual Model	
Jan. 21st	Definition of the Problem in the Field	Assignment 1 Due
Jan. 22nd	Hazard Identification	Term Paper Topic
Jan. 26th	Characterizing the Dose-Response	
Jan. 28th	Standardized Test Methods and GLP	
Feb. 2nd	Effects at the Ecosystem Level	
Feb. 4th	Probabilistic Approaches to ERA	
Feb. 9th	Characterizing Exposure	
Feb. 11th	Extrapolating/Review	Assignment 2 Due
Feb. 16th	*Reading Week*	
Feb. 18th	*Reading Week*	
Feb. 23rd	**Midterm Exam**	
Feb. 25th	Hormesis and ERA	
March 1st	Estimating Environmental Concentrations	
March 3rd	Routes of Exposure	Term Paper Intro Due
March 8th	Biomarkers and ERA	
March 10th	Water Quality Guidelines	
March 15th	Ranking Systems	
March 17th	Dealing with Uncertainty in ERA	
March 22nd	Risk Management and Mitigation	
March 24th	Risk Communication	Assignment 3 Due
March 29th	ERA and GMOs	
March 31st	ERA and Endangered Species	
April 5th	Weight of Evidence	
April 7th	Exam Review	Term Paper Due

April 11th-April 25th Final exam set by Students Records Office

The voluntary withdrawal deadline date for this course is March 18th 2016.