

ENVR 4180 / GEOG 7010 – Winter 2024

Ecotoxicological Risk Characterization

Instructor:	José Luis Rodríguez Gil, PhD
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Email:	jose.rodriguezgil@umanitoba.ca
Office Hrs:	Online by appointment. Please email to set a time
Class location:	ST. JOHN'S COLLEGE Rm: 128
Class day/time:	1:00 - 2:15 PM. Tuesday and Thursday

1 Description

The use of chemicals, whether natural or anthropogenic, is fundamental to our society. Nonetheless, every chemical has the potential to pose a risk to humans and the environment. In order to be able to make effective use of these chemicals while minimizing their risk, a series of methodologies exists for Environmental Risk Assessment (ERA) which are able to inform us of when, and how, these compounds cause their ecological effects, which in turn can inform decision makers as to whether a compound is safe for use and under which conditions.

The aim of this course is to familiarize the student with the methodologies currently in use to assess the risk posed by chemicals and other stressors to the environment. The student will learn of the basic types of chemical and toxicological information needed to characterize the risk as well as the different approaches used to quantify it. The student will progress through the different tiers of increased complexity and data-needs through which compounds can progress as their risk is assessed. The limitations of the current ERA frameworks, as well as new tools and approaches to improve them will be discussed.

2 Prerequisites

- Introductory Toxicology: ENVR 2180, Biology 2180 or Agriculture 2180

3 Learning outcomes

- Students will familiarize themselves with current frameworks for environmental risk assessment as well as their iterative nature.
- Students will be able to formulate the problem posed by a particular chemical or mixture of chemicals and highlight the biological receptors more likely to be at risk.
- Students will be able to determine which biological effects are more likely to result from exposure to a particular chemical, as well as compile effects information to be used to determine appropriate safe exposure levels
- Students will be able to characterize and compile information related to current and/or future exposure of different biological receptors to chemicals.
- Students will be able to combine effects and exposure data to characterize the risk posed by current or future use of a chemical in a qualitative or quantitative way.
- Students will learn about current developments in the standard risk assessment framework aimed to address issues related to data quality/quantity, the use of molecular techniques, the challenges of mixture toxicity and the incorporation of ecosystem services, among others.

4 Course literature

For this work we will be using the course notes for the University of Guelph's toxicological risk characterization (TOX6530/TOX4550/EVB4550) course, originally taught by Professor Keith Solomon who has kindly agreed to share his notes with us for this course. The University of Guelph was home to the first Environmental Toxicology programme in Canada and Dr. Solomon was fundamental in the development of the currently accepted environmental risk assessment frameworks during the 1980's and 1990's. While we will deviate from the notes in the order in which we will see things through the course and we will extend and update some sections, these notes will provide all the needed background information. The student will be provided with a

digital copy of these notes. **This copy is not for distribution outside this course or posting online.**

While not required, the following book below is the best source available on the materials we will be covering. A small number of physical copies are available in the library and no digital access is currently available, so it will not be a required source. If you get access to it, however, do take a look, Glen Sutter is also one of the fathers of the field.

- Suter II, Glenn W. 2007. Ecological risk assessment. CRC press.

5 Camera/microphone policy

This course is delivered primarily in person, however there is the possibility of a number of lectures taking place remotely via Zoom. As a teacher, seeing your students is important for many reasons, but more important than that is the fact that everybody should be entitled to keep the privacy of their homes. **Having your camera/mic on is NOT a requirement**, however, I will have my camera on, and you are more than welcome to do it as well. For discussion pieces and question periods, it is always easier to speak through a mic, but zoom has a fantastic chat tool that you are more than welcome to use. In fact, sometimes, it just works better!

I do acknowledge the fact that without a camera and mic on it becomes easy for those of you listening to not pay attention to the class or just do something else. Believe me, after a few years of zoom meetings, I have been there myself. I do hope that everybody joining this course is doing it for the right reasons and that learning is the main one.

6 Grading scheme:

Item	Weight	Notes
Attendance and Participation	10	-2% for each unjustified absence
Assignments	15	Two assignments. 7.5% each
Risk assessment proposal	10	
Risk assessment final project	25	
Risk assessment presentation	5	
Take home exam	35	

7 Final grade allocation

A+	90% or above	C+	65% - 69%
A	80% - 89%	C	60% - 64%
B+	75% - 79%	D	50% - 59%
B	70% - 74%	F	49% or below

8 COURSE SCHEDULE

The following is the tentative schedule and order of material to be covered in the class. Dates and material may change.

Week	Date	Day	Topic
1	2024-01-09	Tu	Introductions and syllabus. The need for ERA and history
1	2024-01-11	Th	Conceptual framework, Uncertainty, and the precautionary principle
2	2024-01-16	Tu	Problem formulation I
2	2024-01-18	Th	Problem formulation II
3	2024-01-23	Tu	Exposure characterization I
3	2024-01-25	Th	Exposure characterization II
4	2024-01-30	Tu	Effects characterization I
4	2024-02-01	Th	Effects characterization II
5	2024-02-06	Tu	Effects characterization III
5	2024-02-08	Th	Risk characterization I
6	2024-02-13	Tu	Risk characterization II
6	2024-02-15	Th	Risk characterization III
7	2024-02-20	Tu	Winter break
7	2024-02-22	Th	Winter break
8	2024-02-27	Tu	Risk characterization IV
8	2024-02-29	Th	Risk characterization V
9	2024-03-05	Tu	Data quality and reporting (Invited speaker - Mark Hanson)
9	2024-03-07	Th	Causality (Invited speaker - Mark Hanson)
10	2024-03-12	Tu	Risk assessment of species at risk (Invited speaker - Ryan Prosser)
10	2024-03-14	Th	Risk of Mixtures
11	2024-03-19	Tu	Biomarkers and omics tools in risk assessment
11	2024-03-21	Th	Regulatory state of risk assessment
12	2024-03-26	Tu	ERA Presentations 1
12	2024-03-28	Th	ERA Presentations 2
13	2024-04-02	Tu	ERA Presentations 3
13	2024-04-04	Th	Risk management, mitigation, and communication
14	2024-04-09	Tu	Review and Question
14	2024-04-11	Th	No class - Take home exam

9 Evaluation schedule

The following is the tentative schedule of events related to graded contents for the course. Dates may change.

Week	Date	Day	Assignments	Risk assessment	Exams
1	2024-01-09	Tu	-	-	-
1	2024-01-11	Th	-	-	-
2	2024-01-16	Tu	-	-	-
2	2024-01-18	Th	-	-	-
3	2024-01-23	Tu	-	-	-
3	2024-01-25	Th	-	-	-
4	2024-01-30	Tu	Assignment 1	-	-
4	2024-02-01	Th	-	Compound selected	-
5	2024-02-06	Tu	-	-	-
5	2024-02-08	Th	-	-	-
6	2024-02-13	Tu	-	-	-
6	2024-02-15	Th	-	Proposal due	-
7	2024-02-20	Tu	-	-	-
7	2024-02-22	Th	-	-	-
8	2024-02-27	Tu	-	-	-
8	2024-02-29	Th	Assignment 2	-	-
9	2024-03-05	Tu	-	-	-
9	2024-03-07	Th	-	-	-
10	2024-03-12	Tu	-	-	-
10	2024-03-14	Th	-	-	-
11	2024-03-19	Tu	-	-	-
11	2024-03-21	Th	-	-	-
12	2024-03-26	Tu	-	Presentations	-
12	2024-03-28	Th	-	Presentations	-
13	2024-04-02	Tu	-	Presentations	-
13	2024-04-04	Th	-	Final project due	-
14	2024-04-09	Tu	-	-	Take home exam
14	2024-04-11	Th	-	-	Take home exam

11 Student responsibilities

- Students are required to attend all assigned synchronous lectures. Students are expected to be punctual for synchronous classes.
- Students are required to complete the necessary assignments individually and on time, unless otherwise stated.

12 Voluntary withdrawal date

The voluntary withdrawal date is the last date for withdrawing from this course without academic penalty. The voluntary withdrawal date for this course is March 20th, 2024. Evaluative feedback will be provided prior to this date.

13 Evaluation items

13.1. *Take home exam*

You will have **one week** from handout date to complete the take home exam. **A mark of zero will be given to any exam that is handed in late unless permission is granted prior to the deadline.** Please see list below for acceptable and unacceptable reasons for rewriting the take home exam (which will be a new and different exam with a one-week window to write).

Reasons for granting an extension: a death in your immediate family, a significant illness in either yourself or in a dependent. Students who are unable to meet a course requirement due to medical circumstances are **currently not required to submit medical notes**. However, students are required to contact their instructor or academic advisor by email to inform of the missed work and to make arrangements for extensions, deferrals, or make-up assignments. Please follow these guidelines if you are unable to meet an academic requirement for your courses.

- Contact your instructor for term work such as a class, quiz, midterm/test, assignment, lab;
- Contact an advisor in your faculty/college/school of registration for a missed final exam (scheduled in the final examination period);
- Inform your instructor/advisor as soon as possible do not delay. Note for final exams, students must contact within 48 hours of the date of the final exam; and

- Email your instructor/advisor from a U of M email address, and include your full name, student number, course number, and academic work that was missed.

Reasons for not granting an extension: having another assignment due at a similar time/day, being away from the university for a personal reason (i.e. holiday or personal vacation), being too busy with other course work (i.e. having a midterm that same day or week), computer is not working properly and/or you lost the exam, or any other reason deemed inappropriate by the instructor. This is not an exhaustive list. Please do not ask for an extension if any of these or similar reasons apply. If you know that you will be away, you **MUST** submit the assignment before the due date.

13.2. Assignments

The student will need to complete two assignments each worth 7.5% of the final grade (up to a total of 15%).

Assignments must be submitted to UM Learn on time, which will be the lecture time a week after the assignment was handed (e.g. if an assignment is handed out during a Tuesday class, the assignment is due right before the next Tuesday class). Non-submitted assignments or those submitted late without a justified reason will receive a mark of zero.

13.3. Environmental Risk Assessment Project

The student will be tasked, throughout the duration of the course, with completing a full Environmental Risk Assessment (ERA) for a chemical compound of their choice.

The compound must be selected by the end of the fourth week. The student is free to select a compound of their choice, but they must talk to me to ensure that the compound is appropriate for the scope of the course (there is not too much or too little information available). If the student does not have a particular preference, I will provide suggestions. Graduate students in toxicology/related fields are encouraged to use compounds related to their research.

The student will be required to complete a proposal (10% of the final course grade) where the compound will be introduced and which will present the problem formulation stages of the ERA and a skeleton of the next steps.

The final ERA will be due on the last week of class and it is worth 25% of the final grade. A presentation of the main results will be scheduled for the end of the course and will be worth 5% of the final course grade. Altogether, all aspects of the ERA project are worth 40% of the final grade.

The final ERA document must contain the original contents of the proposal (introduction and problem formulation) as well as sections for each Tier of the risk assessment, including Tier 0, Tier 1, Tier 2 (if sufficient information is available) as well as a section indicating whether Tier 3 and Tier 4 work is granted based on the results of the previous Tiers. If Tier 3 and Tier 4 work is recommended a the student must include a short proposal for experiments to be conducted at these Tiers to answer any remaining questions related to the Risk of the chosen compound.

14 Course policies

Audio/Video Recording: Unless otherwise noted, Dr. Jose Luis Rodriguez Gil, and the University of Manitoba hold copyright over the course materials, presentations and lectures which form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission by Dr. Jose Luis Rodriguez Gil. Course materials (both paper and digital) are for the participant's private study and research and are not to be shared online or distributed.

Feedback: Formative (i.e. comments) and summative (i.e. grade) feedback will be provided to the student within two weeks of the assignment deadline (or as soon as possible). Comments on assignments will be provided via UMLearn.

Questions/Concerns: If you are having a problem and want to discuss something, please feel free to see me before/after the online class or make an appointment at a more convenient time.

Emails: Ensure that the course name and number are included in the subject line for all emails. Please make sure emails are written in a professional manner, including complete sentences. Emails must be sent from University of Manitoba email accounts; emails from other accounts (such as Gmail) will not be responded to. Emails will typically be responded to during regular office hours.

Academic Integrity: Academic dishonesty (plagiarism, cheating) is a very serious matter in any academic institution and is dealt with severely at the University of Manitoba.

Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university).

Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room (e.g., crib notes, pagers or cell phones). Exam cheating can also include exam personation (see below). A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty, including a grade of zero on the assignment/exam, a final grade of F in the course or expulsion from the University (based on severity of offense).

To plagiarize is to take ideas or words of another person and pass them off as one's own. In short, it is stealing something intangible rather than an object. Plagiarism applies to any written work, in traditional or electronic format, as well as orally or verbally presented work. Obviously, it is not necessary to state the source of well-known or easily verifiable facts, but students are expected to appropriately acknowledge the sources of ideas and expressions they use in their written work, whether quoted directly or paraphrased. This applies to diagrams, statistical tables and the like, as well as to written material, and materials or information from Internet sources. IF these are required, students must use either APA or Chicago styles to properly reference work, unless otherwise indicated on the assignment/paper/exam. Students will be penalized 20% if another style or footnotes are used in the assignment. Information on the acceptable styles is available through the UM Libraries at: <http://libguides.lib.umanitoba.ca/c.php?g=298394>

To provide adequate and correct documentation is not only an indication of academic honesty but is also a courtesy, which enables the reader to consult these sources with ease. Failure to provide appropriate citations constitutes plagiarism. It will also be considered plagiarism and/or cheating if a student submits a term paper written in whole or in part by someone other than him/herself or copies the answer or answers of another student in any test, examination, or take-home assignment.

Working with other students on assignments, laboratory work, take-home tests, or on-line tests, when the instructor does not permit this, can constitute Inappropriate Collaboration and may be subject to penalty under the Student Discipline By-Law.

An assignment that is prepared and submitted for one course should not be used for a different course. This is called “duplicate submission” and represents a form of cheating because course requirements are expected to be fulfilled through original work for each course.

Please familiarize yourself with the University policy on academic dishonesty found on the following website:

http://www.umanitoba.ca/student/resource/student_advocacy/cheating_plagiarism_fraud.html.

When in doubt about any practice, ask your professor or instructor.

Examinations Personations is when a student who arranges for another individual to undertake or write any nature of examination for and on his/her behalf, as well as the individual who undertakes or writes the examination, will be subject to discipline under the university’s Student Discipline Bylaw, which could lead to suspension or expulsion from the university. In addition, the Canadian Criminal Code treats the personation of a candidate at a competitive or qualifying examination held at a university as an offence punishable by summary conviction. Section 362 of the code provides:

Personation at Examination

362. Everyone who falsely, with intent to gain advantage for him/herself or some other person, personates a candidate at a competitive or qualifying examination held under the authority of law or in connection with a university, college or school or who knowingly avails him/herself of the results of such personation is guilty of an offence punishable on summary conviction. 1953-54, c.51, s.347.

Both the personator and the individual who avails him/herself of the personation could be found guilty. Summary conviction could result in a fine being levied or up to two years of imprisonment.

A complete copy of the Final Examination Procedures is available at:

http://umanitoba.ca/admin/governance/governing_documents/academic/final_examinations_procedures.html

Students are encouraged to review the University policy on Responsibilities of Academic Staff with Regards to Students (ROASS):

umanitoba.ca/admin/governance/governing_documents/students/278.html

15 Special needs

Students with disability-related needs or are experiencing difficulty should discuss issues with a councillor in one of the following Student Affairs offices as soon as possible. You can also discuss any issues with your instructor, who can direct you to appropriate institutional resources.

- Student Accessibility Services: 155 University Center, 204-474-6213, 204-474-9790 (TTY)
- Learning Assistance Center: 201 Tier Building, 204-480-1481
- Student Counselling and Career Centre: 474 University Center, 204-474-8592

16 Using copyrighted material

Please respect copyright. We will use copyrighted content in this course. I have ensured that the content I use is appropriately acknowledged and is copied in accordance with copyright laws and University guidelines. Copyrighted works, including those created by me, are made available for private study and research and must not be distributed in any format without permission. Do not upload copyrighted works to a learning management system (such as UM Learn), or any website, unless an exception to the Copyright Act applies or written permission has been confirmed. For more information, see the University's Copyright Office website at <http://umanitoba.ca/copyright/> or contact um_copyright@umanitoba.ca.

17 University policies and procedures

A list of academic supports available to Students:

17.1. *Writing and Learning Support*

The Academic Learning Centre (ALC) offers services that may be helpful to you throughout your academic program. Through the ALC, you can meet with a learning specialist to discuss concerns such as time management, learning strategies, and test-taking strategies. The ALC also offers peer supported study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In these study groups, students have opportunities to ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

You can also meet one-to-one with a writing tutor who can give you feedback at any stage of the writing process, whether you are just beginning to work on a written assignment or already have a draft. If you are interested in meeting with a writing tutor, reserve your appointment two to three days in advance of the time you would like to meet. Also, plan to meet with a writing tutor a few days before your paper is due so that you have time to work with the tutor's feedback.

These Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at:

<http://umanitoba.ca/student/academiclearning/>

You can also contact the Academic Learning Centre by calling 204-480-1481 or by visiting 201 Tier Building.

17.2. *University of Manitoba Libraries (UML)*

As the primary contact for all research needs, your liaison librarian can play a vital role when completing academic papers and assignments. Liaisons can answer questions about managing citations, or locating appropriate resources, and will address any other concerns you may have, regarding the research process. Liaisons can be contacted by email or phone and are also available to meet with you in-person. A complete list of liaison librarians can be found by

subject: <http://bit.ly/WcEbA1> or name: <http://bit.ly/1tJ0bB4>. In addition, general library assistance is provided in person at 19 University Libraries, located on both the Fort Garry and Bannatyne campuses, as well as in many Winnipeg hospitals. For a listing of all libraries, please consult the following: <http://bit.ly/1sXe6RA>. When working remotely, students can also receive help online, via the Ask-a-Librarian chat found on the Libraries' homepage: www.umanitoba.ca/libraries.

17.3. Referral information for mental health resources and support:

For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781. You may also find the following resources helpful:

17.4. Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. Student Counselling Centre: <http://umanitoba.ca/student/counselling/index.html>

474 University Centre or S207 Medical Services

(204) 474-8592

17.5. Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

Student Support Intake Assistant <http://umanitoba.ca/student/case-manager/index.html>

520 University Centre

(204) 474-7423

17.6. *University Health Service*

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

University Health Service <http://umanitoba.ca/student/health/>

104 University Centre, Fort Garry Campus

(204) 474-8411 (Business hours or after hours/urgent calls)

17.7. *Health and Wellness*

Contact our Health and Wellness Educator if you are interested in information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.

Health and Wellness Educator <http://umanitoba.ca/student/health-wellness/welcome.html>

Katie.Kutryk@umanitoba.ca

469 University Centre

(204) 295-9032

Live Well @ UofM

For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site: <http://umanitoba.ca/student/livewell/index.html>

17.8. *Your Rights and Responsibilities*

As a student of the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The Academic Calendar <http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections University Policies and Procedures and General Academic Regulations. While all of the information contained in these two sections is important, the following information is highlighted.

- If you have questions about your grades, talk to your instructor. There is a process for term work and final grade appeals. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form <http://umanitoba.ca/registrar/>
- You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the Academic Integrity regulation. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/> View the Student Academic Misconduct procedure for more information.

17.9. Respectful Work and Learning Environment

The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected conduct yourself in an appropriate respectful manner. Policies governing behavior include the:

17.10. Respectful Work and Learning Environment

Please refer to the document:

http://umanitoba.ca/admin/governance/governing_documents/community/230.html

17.11. Student Discipline

Please refer to the document:

http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html

17.12. *Violent or Threatening Behaviour*

Please refer to the document:

http://umanitoba.ca/admin/governance/governing_documents/community/669.html

17.13. *Sexual Assault*

If you experience Sexual Assault or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The Sexual Assault policy may be found at: http://umanitoba.ca/admin/governance/governing_documents/community/230.html More information and resources can be found by reviewing the Sexual Assault site

<http://umanitoba.ca/student/sexual-assault/>

17.14. *Intellectual Property*

For information about rights and responsibilities regarding Intellectual Property view the policy

http://umanitoba.ca/admin/governance/media/Intellectual_Property_Policy_-_2013_10_01.pdf

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site

<http://umanitoba.ca/faculties/>

Contact an Academic Advisor within our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

17.15. *Student Advocacy*

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

<http://umanitoba.ca/student/advocacy/>
520 University Centre
204 474 7423
student_advocacy@umanitoba.ca