

Course Outline Form: Winter 2020

General Information

Course Title: STAT*3510 Environmental Risk Assessment

Course Description: Contemporary statistical methods for assessing risk, including dose-response models, survival analysis, relative risk analysis, bioassay, estimating methods for zero risk, trend analysis, survey of models for assessing risk. Case studies illustrate the methods.

Prerequisites: STAT*2050

Credit Weight: 0.5

Academic Department (or campus): Mathematics & Statistics

Campus: University of Guelph

Semester Offering: Winter 2020

Class Schedule and Location: M/W/F 10:30am – 11:20am, CRSC 116

Instructor Information

Instructor Name: Dr. Lorna Deeth

Instructor Email: ldeth@uoguelph.ca

Office location and office hours: MACN 548. Office hours are Monday & Wednesday, 1:00pm – 3:00pm.

Course Content

Specific Learning Outcomes:

This course is designed to give students experience and confidence in the analysis of data related to (non-financial) risk assessment. Students will gain basic practical experience in summarizing, analyzing and interpreting data related to risk assessments using standard statistical methods. At the end of this course students should:

1. Make and interpret visual and numerical summaries of data related to risk assessment.
2. Select the appropriate statistical method for a given data set related to risk assessment.
3. Use appropriate statistical computer software to explore and analyze data related to risk assessment.
4. Understand statistical language as used in the scientific literature on risk.
5. Interpret results of a risk assessment and communicate them to other scientists.

Lecture Content:

The course will cover the following topics, though some components may be assigned for independent study. Additional topics will be covered as time permits.

- Causality/confounding/Simpson's paradox
- Measures of risk
- Hypothesis testing (Chi-squared, Fisher's exact)
- Study designs and invariance of odds-ratios
- Review of linear regression
- Interactions, polynomials and broken stick models in linear regression
- Logistic regression
- Regression of count data (Poisson regression)

- Environmental Risk Assessment
- Survival analysis, left censoring and AFT models
- Individual-level models for infectious diseases (time permitting)
- Cox proportional hazards models (time permitting)

Course Assignments and Tests:

| Course Component | Date | Time | Location | Weight |
|----------------------|--------------------------------------|-------------------|----------|--|
| Assignment 1 | Friday, January 31 | Due by 11:59pm | Online | 4% each |
| Assignment 2 | Friday, February 28 | Due by 11:59pm | Online | Total: 12% |
| Assignment 3 | Friday, March 27 | Due by 11:59pm | Online | |
| In-class Assignments | January 24, February 14, March 20 | Due by 11:20am | In-class | |
| Term Test 1 | Friday, February 7 | 10:30am – 11:20am | CRSC 116 | 18% best test 12% worst test Total: 30% |
| Term Test 2 | Friday, March 13 | 10:30am – 11:20am | CRSC 116 | |
| Course Project* | Friday, March 6 (proposal) | Due by 11:59pm | Online | 2% |
| | Wednesday, April 1 (final report) | Due by 11:59pm | Online | 10% Total: 12%* |
| Final Exam | Wednesday, April 8 | 7pm – 9pm | TBA | Total: 40% |

*See information on Courselink for Course Project details, including exact deadlines and breakdown of grading components.

Course Resources

Required / Recommended Texts: N/A

Other Resources: A set of incomplete lecture notes will be posted on Courselink. It is expected students will have a copy of these notes available, and will fill them in during lectures. Completed lecture notes will not be posted online.

Every attempt will be made to post each set of weekly notes on the preceding Friday, however students are expected to check Courselink regularly for the availability of the notes.

THE LECTURE NOTES ARE FOR INDEPENDENT USE ONLY, AND ARE NOT TO BE RE-DISTRIBUTED IN ANY FORM WITHOUT MY WRITTEN PERMISSION.

R Statistical Software: Students will be using the statistical software program R/RStudio for their course work. R/RStudio is available on the computers in the Science Complex computer labs; however, students may wish to download and install R/RStudio on their personal computers. R/RStudio is freely available, and runs on both Windows and Mac machines. See the information on Courselink for where to obtain R/RStudio.

Course Policies

Communication Policies: My preferred method of communication is in-person or by email. For email communication, you must use your University of Guelph email account. Use STAT*3510 in your subject line, and include your name and student ID number in all correspondence. Emails that do not include a name and ID number, or from non-uoguelph accounts, will not be answered; otherwise, I will try to respond to emails within 3 business days. Please note that only administrative inquiries will be answered via email; questions regarding assignments, course content, etc. will only be answered during office hours or in lecture.

Grading Policies:

Assignments: There will be a total of 3 written assignments throughout the semester. Assignments will be submitted through the online system Crowdmark, and must be submitted by the specified date and time. Details about how to submit assignments will be posted on Courselink. **No late assignments will be accepted, and late or missed assignments will automatically receive a grade of 0.** Students who cannot complete an assignment for a valid reason should speak with me *before* the assignment deadline, and be prepared to provide appropriate documentation. In this situation, a student's final exam will be reweighted to make up for the missed assignment.

Students are responsible for answering all questions on an assignment, however for some assignments not every question will be marked. Full solutions will be posted on Courselink, and it is your responsibility to review the solutions and evaluate your performance on any unmarked questions.

In-class Assignments: There are 3 in-class assignments, which will be completed in groups and submitted during lecture on the specified dates. Students are expected to be in lecture during these times, and **missed in-class assignments will receive an automatic grade of 0.** Students who miss an in-class assignment date for a valid reason must speak with me within three business days of the missed class. In this situation, the student's final exam will be reweighted to make up for the missed in-class assignment.

Term Tests & Final Exam: The term tests will be held in class, and therefore no student should have a conflict with the dates or times. If a conflict does exist, **it is your responsibility to resolve it immediately**. Students who miss a term test for a valid, documented reason (such as a medical illness) must contact me within 3 business days of the missed test and provide the appropriate documentation. In this situation, the student's final exam will be reweighted to make up for the missed test.

The final exam (date, time and location) is scheduled by the Registrar's Office. Students who miss the final exam due to a valid, documented reason must contact their Program Counsellor for advice on University regulations regarding final exams. These procedures are based on University policy, and are not under the control of the course instructor.

For the term tests, students are permitted **one** double-sided 8.5" x 11" (letter size) reference page for each term test (that is, one double-sided 8.5" x 11" reference page per test), and **two** double-sided 8.5" x 11" (letter size) pages are permitted for the final exam. You are free to write whatever you would like on your reference pages; however, the reference pages must be handwritten! For both the midterm and the final exam, students will be allowed a stand-alone calculator, however cell phones and/or laptop computers may not be used as calculators and will be confiscated.

Course Project: The course project will be completed in groups (assigned by the Instructor) and will consist of a written proposal, data analysis, and final written report. Detailed information about the course projects will be posted on Courselink later in the semester.

Regrade Request Procedures: In the event a student wishes to have an assignment or test question regraded, the student must submit a **Regrade Request Form** (available on Courselink) within two weeks of the graded work being returned. After two weeks, the grade in question is considered final, and regrade requests can no longer be submitted. Note that in the event a student submits a question for regrading, we (the TA and myself) reserve the right to regrade the entire assignment/test.

Course Policy on Group Work:

Students are encouraged to work together to discuss course content, share ideas, and ask/answer questions. The in-class assignments and course project will be completed in groups assigned by the Instructor. The three written assignments can be completed independently or with a partner of your choosing; instructions for how to submit these assignments will be posted on Courselink. Note that in the event your partner is unable to complete an assignment for whatever reason, you will still be expected to complete and submit the assignment on your own.

All term tests and the final exam must be completed independently.

Any unauthorized collaboration, completing another student's work, or having another student complete your work, will constitute academic misconduct.

University Policies

Email Communication:

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement:

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

Drop Date:

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

Copies of Out-of-class Assignments:

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility:

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website <https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website <https://www.ridgetownc.com/services/accessibilityservices.cfm>

Academic Integrity:

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Recording of Materials:

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources:

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

Mental Health Services:

One out of every five students in Canada experiences some sort of mental health issue at some point in their academic career. If you find yourself facing a mental health crisis, or just need to talk to someone, please consider taking advantage of one of the following resources available to University of Guelph students:

Counseling Services: (x53244) is located at Health Services (J.T. Powell Building) and offers individual and group counselling sessions by appointment or walk-in.

Student Support Network: is located in Raithby House (across from the cannon and offers confidential, peer-based, drop-in support.

Good2Talk: ([1-866-925-5454](tel:1-866-925-5454)) is a free, 24/7 student hotline that provides professional counselling and referrals for mental health, addictions and well-being.

Here 24/7: ([1-844-437-3247](tel:1-844-437-3247)) specializes in assessment, referral and appointment booking and is available 24/7 for crisis support.

You are not alone and you will not be judged for asking for help.