

Course Outline Form: Winter 2016

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.

Credit Weight: 0.5

Academic Department (or campus): Mathematics & Statistics

Campus: University of Guelph

Semester Offering: Winter 2016

Class Schedule and Location: MWF 8:30am – 9:20am

Instructor Information

Instructor Name: Charles (Charlie) Keown-Stoneman

Instructor Email: keownstc@uoguelph.ca

Office location and office hours: MACN 511, Mondays 11 am-1pm (or by appointment)

GTA Information

GTA Name: Justin Angevaare

GTA Email: jangevaa@uoguelph.ca

GTA office hours and location: N/A

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:

- 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)
- CDF and tests involving CDF
- Environmental Risk Assessment
- Survival analysis, left censoring and AFT models
- Cox proportional hazards models (time permitting)
- Repeated Measures (time permitting)

Labs:

Four labs during class time on the following Wednesdays:

1. Jan 20
2. Feb 3
3. Mar 2
4. Mar 16

Course Assignments and Tests:

Assessment	Due Dates	Grade Weight
Assignments*	Jan 27, Feb 10, Mar 9, Mar 30*	25%*
Midterm 1	Feb 24 (during lecture time)	20%
Midterm 2	Mar 23 (during lecture time)	20%
Final Exam	Apr 22	35%

*Best 3 out of 4

Final examination date and time:

April 22nd 2016 08:30AM - 10:30AM, Location TBA.

Course Resources

Required Texts:

N/A

Recommended Texts:

N/A

Other Resources:

Lecture notes, assignments, solutions, etc. will be posted
<https://courselink.uoguelph.ca/shared/login/login.html>

Course Policies

Grading Policies

Assignments:

- There will be 4 assignments, but only your best 3 assignments will count for evaluation.
- Assignments will be worked on in labs in SCIE1303 and 1305, during class time, on Jan 20, Feb 3, Mar 2, Mar 16.
- **Assignment due dates are: Jan 27, Feb 10, Mar 9, Mar 30 (Wednesdays)**
- **Assignments are due at 5 pm**, in the INBOX #196 on the 3rd floor of the library
- **No late assignments will be accepted.**
- We will place marked assignments in the OUTBOX #197 on the 3rd floor of the library. Please write your name and student ID on the first page. **Please write your name only on the back of the last page of your assignment** (for confidentiality reasons).
- As stated above, only the best 3 out of 4 marks will count towards your final assignment mark. If you do not hand in one assignment, or one assignment is late, the other 3 assignments will count towards your mark. While this in a sense gives you a “free” assignment that does not have to be passed in, it is in your best interests to do all 4 assignments, because they reinforce concepts introduced in lectures and are good practice for the tests.
- If you are unable to pass in an assignment due to sickness, then that will count as your “free” assignment, and your mark will be based on the remaining 3 assignments. If you miss two assignments, you will get a mark of 0 for one of them, unless you have a valid reason, in which case the assignment mark will be reweighted accordingly.
- Each assignment will be worth the same amount (8.33%) of your final mark, even though assignment 1 may be marked out of say 10, assignment 2 out of 20, etc.

- You are responsible for answering all of the questions on each assignment because these will help prepare you for the course exams. However, we may not mark all the questions. Solutions for each assignment will be posted on the course website. **It is up to you to check the answer sheet to evaluate your performance on the assignments.**
 - Assignments and projects generally require use of SAS and can be done on computers in
 - the cloud using SasOnDemand
 - SCIE 1303, 1305 between 8:30 and 4:30 on weekdays when not booked
 - the library
- NOTE: SCIE and library computers are shared and may be heavily used at some times. Please don't leave your assignment until the last minute!!!

Tests

- Tests will be open notes – you can bring notes and handouts as well as (marked) assignments and solutions. You can bring your calculator, but no computers or programmable calculators please! Absolutely no cell phones or smart phones, etc.
- If you miss a midterm for a valid reason, the weight will be moved to the final exam.
- If you miss the final exam for any reason, you must see your program counselor. University regulations require special procedures to be followed regarding the conduct of final examinations, including resource, if any, for missed final examinations. These procedures are out of my control.
- Should you need to miss a test or assignment for religious purposes, please advise me within the first two weeks of classes.

Course Policy on Group Work:

- Discussion often leads to better understanding and so we encourage group thinking. However, we urge you to not divide up the work. You will get the best value if you work together to increase your comprehension and not to do less work. Statistical analysis, data exploration, and the learning of statistical software only comes with experience.
- **Each student must hand in a separate complete assignment, and this must be original work and not be copied from another student.**

Course Policy regarding use of electronic devices and recording of lectures

Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

Additional Course Information

N/A

University Policies

Academic Accommodation of Religious Obligations

If you are unable to complete a course requirement due to religious obligations, please let the instructor know within the first two weeks of class. See the academic calendar for more information:

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

Academic Consideration

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, ID#, and e-mail contact. See the academic calendar for information on regulations and procedures for Academic Consideration:

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

Academic Misconduct

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 discourages misconduct. 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.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

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

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or

a short-term disability should contact the Student Accessibilities Services (SAS) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: <http://www.uoguelph.ca/csd/>

Course Evaluation Information

Please see <http://www.mathstat.uoguelph.ca/files/TeachevaluationformF10.pdf>

Drop date

The last date to drop one-semester courses, without academic penalty, is ***Friday, March 11, 2016***. For regulations and procedures for Dropping Courses, see the Academic Calendar: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>