

# Course Outline: Winter 2017

## General Information

**Course Title:** STAT\*4050/4060/6802 – Topics in Applied Statistics I and II/GLMs and Extensions

**Course Description:** Topics include: generalized linear models; generalized linear mixed models; joint modelling of mean and dispersion; generalized estimating equations; modelling longitudinal categorical data; modelling clustered data. This course will focus both on theory and implementation using relevant statistical software.

**Credit Weight:** 0.5 credits

**Academic Department (or campus):** Mathematics & Statistics

**Campus:** University of Guelph

**Semester Offering:** Fall

**Class Schedule and Location:** Monday/Wednesday/Friday, 11:30am – 12:20pm in MCKN 225

## Instructor Information

**Instructor Name:** Lorna Deeth

**Instructor Email:** ldeeth@uoguelph.ca

**Office location and office hours:** MACN 548, ext. 53034 (no voicemail!). Office Hours: M/W/F: 1 – 2:30pm

## Course Content

**Specific Learning Outcomes:** This course introduces statistical methods for analyzing data with non-normal responses, such as binary or count data. The course covers a blend of theory, methodology, application and data analysis using the R software package.

### **Lecture Content:**

The following is a tentative outline of the lecture topics and schedule. While we will cover the majority of the listed topics, the exact topics, order and timing is subject to change.

<b>Lecture Dates</b>	<b>Topic</b>
January 9 – 13	Introduction, basic concepts and review
January 16 – 20	Outline of GLMs
January 23 – 27	Linear models for continuous data
January 30 – February 10	Models for binomial data
February 13 – March 3	Count data, Poisson regression, and log-linear models
<i>NOTE: Reading Week – February 20 - 24</i>	
March 6 – 8	Quasi-likelihood
March 10 – 17	Linear mixed models
March 20 - 31	GLMMs and GEEs
April 3 - 7	Project presentations

**Note 1:** The midterm is being held in class on Wednesday, February 28 and will cover material up to and including the February 17 lecture.

## Course Assignments and Tests:

Course Component	Approximate Due Date	Weight
Assignment 1	Friday, February 3, in class	20% (all assignments equally weighted)
Assignment 2	Friday, February 17, in class	
Assignment 3	Friday, March 10, in class	
Assignment 4	Friday, March 24, in class	
Midterm	Wednesday, March 1, in class	20%
Project Outline	Friday, March 10, in class	40%
Final Project	Monday, April 17, 4:00pm	
Final Presentation	Week of April 3 – 7, in class.	20%

## Course Resources

### Recommended Text:

*Extending the Linear Model with R* by Julian J. Faraway. 2<sup>nd</sup> edition. Chapman & Hall/CRC

### Other Text:

*Generalized Linear Models* by P. McCullagh and J.A. Nelder. 2<sup>nd</sup> edition. Chapman & Hall/CRC.

\*While not officially a textbook for this course, it is a very good reference book for this topic.

### Other Resources:

**Lecture notes:** Occasionally, computer output and/or class handouts will be posted on Courselink for use during lecture. In these situations, I will provide as much notification as possible to allow time for printing. Otherwise, students will be expected to take notes during class.

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

**Statistical Software:** This course will require the use of the statistical software package R, which is an open source software package compatible with both Windows and Mac machines. R is available on most on-campus computers, however students can download and install R on their personal machines through the website: <http://www.r-project.org/>. It is strongly recommended students obtain R on their personal machines.

## 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\*4050/4060/6802 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, in lecture, or on the Courselink discussion board.

### Grading Policies

**Assignments:** There will be a total of 4 assignments throughout the semester. The assignments will be due in class on the specified assignment due date. **No late assignments will be accepted, and late or missed assignments will automatically receive a grade of 0.**

**Midterm:** The midterm is held during class, so any conflicts **are the responsibility of the student to resolve**. Students who miss the midterm for a valid, documented reason (such as a medical illness) must contact me within 5 business days of the missed midterm, and provide the appropriate documentation. In this situation, I will attempt to allow the student a secondary sitting of the midterm; failing this, the remaining coursework will be reweighted to make up for the missed test.

**Final Project and Presentation:** Students are expected to complete a final project using data analysis techniques discussed in the course. Students registered in STAT\*4050 and STAT\*4060 will complete the project in groups of 2 or 3 (to be decided by me), while students registered in STAT\*6802 will complete the project independently. Projects and presentations will be graded based on scientific content, organization, and communication of ideas. Details of the project outline, final project, and project presentation are provided in a separate document.

As with some assignment questions, the final project is to be submitted through a Dropbox folder on Courselink for the purposes of utilizing *Turnitin*, a tool that compares your written submission with a variety of other sources to determine the originality of your work. Further comments on the use of *Turnitin* are given in the section on Academic Misconduct. For the final project, students will have the opportunity to submit a “preview” of their project, and view the originality report generated by *Turnitin*. This will allow students to make any necessary adjustments to their project before their final submission. More information about this preview will be discussed in class.

**Course Policy on Group Work:** Students are encouraged to work together to discuss course content, share ideas, and ask/answer questions. However, all submitted work must be done **independently**; completing another student’s work, having another student complete your work, or copying another student’s work will constitute academic misconduct.

**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.

## **University Policies**

### **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.

In this course, I will be using *Turnitin*, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph. However, the primary purpose of using *Turnitin* is pedagogical, and to help students understand and clarify the boundaries of academic misconduct.

All submitted assignments will be included as source documents in the *Turnitin.com* reference database solely for the purpose of detecting plagiarism of such papers. Use of the *Turnitin.com* service is subject to the Usage Policy posted on the *Turnitin.com* site.

In addition to *Turnitin*, I reserve the right to use other electronic (for example, Google) and printed resources to check for inappropriately referenced, or unreferenced, material.

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 Centre for Students with Disabilities as soon as possible.

For more information, contact CSD at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto: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 10, 2017**. For regulations and procedures for Dropping Courses, see the Academic Calendar:

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

### **Additional Course Information**

Any additional information regarding the course, including (but not limited to) important announcements, assignment information, test room confirmations, etc., will be posted on Courselink. Students are encouraged to check this website daily for any new information.