

**University of Guelph**  
**Department of Mathematics and Statistics**  
**College of Physical and Engineering Science**  
**STAT\*6802: Generalized Linear Models and Extensions (0.5 credit)**

**Instructor:** Gerarda Darlington  
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Extension 53292  
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**Office hours:** Wednesday from 9:30am to 11:00am in MACN 514

**Lectures:** Tuesday and Thursday 4:00pm to 5:20pm in MINS, Room 017

**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. Offered in conjunction with STAT\*4050/4060. Extra work is required for graduate students.

**Textbook:** Extending the Linear Model with R, Second Edition  
Julian J. Faraway  
Chapman & Hall/CRC 2016

**Course Topics:**

- Review of linear models
- Logistic regression and extensions
- Study design
- Poisson regression and extensions
- Generalized linear models
- Overdispersion
- Quasi-likelihood
- Generalized estimating equations
- Linear mixed models
- Generalized linear mixed models
- Topics in contingency table analysis
- Models for multinomial and ordinal outcomes

**Marking Scheme and Due Dates:**

Assignments	30%	2 assignments (15% each) Due dates are: February 11 before 5:00pm; March 12 before 5:00pm
Midterm	20%	Thursday February 27
Seminar	15%	Held in the last two weeks of classes
Project outline	5%	Due Tuesday March 3 before 5:00pm
Project	30%	Due Wednesday April 8 before 5:00pm

**NO LATE WORK WILL BE ACCEPTED.**

**NOTE:** You should have **NO** conflicts concerning these dates and times. If you do it is your responsibility to resolve them as soon as possible.

### **Assignments:**

Assignments will involve methods questions, data analyses, and results interpretations and the work that you submit must be your own work. Your submissions must be handed in by the indicated deadlines using the Dropbox option on the STAT\*6802 Courselink site. *Turnitin* and Google will be used to check for potential plagiarism/copying. **Late submissions will not be accepted.**

### **Midterm:**

The midterm will be held in class on Thursday February 27. You will have 80 minutes to complete the midterm questions. This will be an open book examination but you are not allowed access to online materials during the examination. Only stand-alone calculators are allowed.

### **Seminar, Project Outline, and Final Project:**

The seminar/final project will be on a topic of your choice that is relevant to course topics. The goal of the project is to present details on a specific method not covered in course lectures. A brief project outline (no more than 2 pages) of your topic must be submitted using the Dropbox option on the STAT\*6802 Courselink site by the indicated deadline.

Seminars will be held during the final two weeks of the course. Each seminar must be no more than 20 minutes in length. You are expected to attend and provide feedback on all student seminars.

The final written project must be submitted using the Dropbox option on the STAT\*6802 Courselink site by the indicated deadline. **Late submissions will not be accepted.** The final project, including the title page, tables, figures, and references, must be no more than 12 pages with text that is double-spaced and in 12 point font with one inch margins. Tables and/or figures must be clearly labelled and clearly referred to in the text. Attaching computer output is not acceptable. Any computer code used must be commented and included with your project as an appendix. This appendix is not included in the page limit. References to all sources of information must be made throughout the text in the style used in the journal *Biometrics* or using the *apa* bibTEX style and a list of correct references must be included. Your project outline and final project **must be in your own words**. *Turnitin* and Google will be used to check for potential plagiarism/copying.

Seminars and final projects will be graded based on content, writing, difficulty/originality, and overall presentation.

### **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 classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

**E-mail Communication:** As per university regulations, all students are required to check their University of Guelph GryphMail account <uoguelph.ca> 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 regulations and procedures for [Academic Consideration](#) are detailed in the Graduate Calendar.

**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 the graduate calendar: [General Regulations](#)

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

**Accessibility:** The University of Guelph 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 Student Accessibility Services as soon as possible.

For more information, contact [Accessibility Services](#) at 519-824-4120 ext. 56208 or email [accessibility@uoguelph.ca](mailto:accessibility@uoguelph.ca)

**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 Graduate Calendar

**Resources:** The [Academic Calendars](#) are the sources of information about the University of Guelph's procedures, policies and regulations that apply to undergraduate, graduate and diploma programs.

**Tentative Lecture Schedule:**

Week	Topics
Jan 6 – 10	Review of linear models; Binary outcomes
Jan 13 – 17	Logistic regression and extensions; Study design
Jan 20 – 24	Count outcomes; Poisson regression
Jan 27 – 31	Generalized linear models
Feb 3 – 7	Overdispersion; Quasi-likelihood
Feb 10 – 14	Generalized estimating equations
Feb 17 – 21	Winter Break – no lectures/office hours
Feb 24 – 28	Linear mixed models; Midterm
Mar 2 – 6	Generalized linear mixed models
Mar 9 – 13	Topics in contingency table analysis
Mar 16 – 20	Models for multinomial and ordinal outcomes
Mar 23 – 27	Student presentations
Mar 30 – Apr 3	Student presentations