STAT*4060 01: Topics in Applied Statistics II

TEMPLATE:

Standard Formatting

COMMON TEXT

~~INSTRUCTOR NOTES for SYL~~

Content removed by user.

SIS

STAT*4060 - Topics in Applied Statistics II

Winter 2024 Course Outline
Section: 01
Credits: 0.50

Land Acknowledgement: Guelph

COMMON TEXT

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn**.**

Calendar Description

CATALOG

Same as for [STAT*4050](#).
Prerequisite(s): STAT*3110, STAT*3240
Department(s): Department of Mathematics and Statistics

Course Description

THIS SYLLABUS

This course is offered in conjunction with STAT*6802 Generalized Linear Models and Extensions that has the following 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.

COMMON TEXT

~~Course Fit Within Program/Curriculum~~

Content removed by user.

Lecture Schedule

SIS

TuTh 4pm-5:20pm in MCKN*316 (1/8 to 4/23)

COMMON TEXT

~~Lab / Seminar Schedule~~

Content removed by user.

Instructor Information

SIS

Gerarda Darlington
Email: gdarling@uoguelph.ca

CLOSE AND REVIEW

Office Hours

THIS SYLLABUS

Office hours are by appointment arranged, with adequate notice, via email (gdarling@uoguelph.ca).

Textbooks

THIS SYLLABUS

Title	
EXTENDING THE LINEAR MODEL WITH R	
Author	
FARAWAY	
ISBN	
9781498720960	
Title	
(AC) EBOOK EXTENDING THE LINEAR MODEL WITH R	
Author	
FARAWAY	
ISBN	
9781498720984	

Course Resources

THIS SYLLABUS

Course Resources

In addition to the Faraway textbook indicated above, lecture notes that you prepare during class will serve as an important resource. Lecture notes will not be posted online.

The statistical software that will be used in this course is R, which is freely available for download at http://www.r-project.org/. Please install R on your personal computer and having R available during class will be important.

Course information and materials (e.g., course outline, assignments, and announcements) will be available using CourseLink. Students are responsible to check the course website regularly for updates, information, and announcements.

Campus Resources

If you are concerned about any aspect of your academic program: Make an appointment with a Program Counsellor in your degree program. If you are struggling to succeed academically: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills.

~~Library Course Reserve (Ares)~~

COMMON TEXT

Content removed by user.

~~Course Learning Outcomes~~

CIM

Content removed by user.

Course Level Learning Outcomes

THIS SYLLABUS

After successful completion of the course, students will be able to:

- Be confident with linear regression modelling and maximum likelihood estimation
- Be proficient with correctly stating statistical models
- Fit and interpret logistic regression models relative to relevant study designs
- Fit and interpret Poisson regression models relative to relevant study designs
- Understand concepts related to generalized linear models and their applications
- Fit and interpret linear mixed models relative to relevant study designs
- Understand concepts related to generalized linear mixed models and their applications
- Understand concepts related to generalized estimating equations and their applications
- Understand statistical methods for contingency table data and multinomial and ordinal outcomes
- Demonstrate ability to use R to fit appropriate models to data

- Demonstrate ability to appropriately summarize results of statistical analyses in a clear and meaningful manner
- Demonstrate proficiency with note-taking and time-management
- Demonstrate ability to do independent work
- Demonstrate ability to present work and answer questions in a public seminar
- Demonstrate ability to appropriately reference sources of information and code

~~Open Text Field~~

COMMON TEXT

Content removed by user.

Assessment Dates and Deadlines and Tentative Schedule of Topics

THIS SYLLABUS

Week of
1/9
Topic
Review of maximum likelihood estimation; Review of linear regression
Week of
1/16
Topic
Binary outcomes; Logistic regression and extensions; Study design
Week of
1/23
Topic
Count outcomes; Poisson regression; Study design
Week of
1/30
Topic
Generalized linear models
Week of
2/6
Topic
Overdispersion; Quasi-likelihood
Activities
Assignment 1 due on Wednesday February 7 by 5:00pm
Due:
Assignment 1 due on Wednesday February 7 by 5:00pm
Week of
2/13
Topic
Generalized estimating equations
Week of
2/20
Activities
Winter Break
Week of
2/22
Activities
Winter Break

Week of 2/27	
Topic Linear mixed models	
Activities Midterm held in class on Thursday February 29	
Due: Midterm held in class on Thursday February 29	
Week of 3/5	
Topic Generalized linear mixed models	
Activities Seminar topic and brief proposal due on Wednesday March 6 by 5:00pm	
Due: Seminar topic and brief proposal due on Wednesday March 6 by 5:00pm	
Week of 3/12	
Topic Topics in contingency table analysis	
Activities Assignment 2 due on Wednesday March 13 by 5:00pm	
Due: Assignment 2 due on Wednesday March 13 by 5:00pm	
Week of 3/19	
Topic Models for multinomial and ordinal outcomes; Other topics	
Week of 3/26	
Activities Student presentations	
Due: Student presentations	
Week of 4/2	
Activities Student presentations	
Due: Student presentations	
Week of 4/9	
Topic UofG examination period begins on Thursday April 11	
Week of 4/23	
Topic UofG examination period ends on Tuesday April 23	

THIS SYLLABUS

~~Lab / Seminar Schedule~~ 👁

Content removed by user.

COMMON TEXT

~~Teaching and Learning Activities~~ 👁

Content removed by user.

Assessment Breakdown

Description	Weighting (%)	Due Date
Assignments	20%	Assignment 1 due Wednesday February 7 by 5:00pm; Assignment 2 due Wednesday March 13 by 5:00pm.
Midterm	25%	Thursday February 29 - in class.
Seminar topic and brief proposal	5%	Due Wednesday March 6 by 5:00pm.
Seminar	20%	TBD but held in class during the final two weeks of classes.
Final exam	30%	TBD but held in person during the Final Exam Period (April 11 to 23, inclusive).

~~Assessment Details~~

THIS SYLLABUS

Content removed by user.

Final Exam

SIS

Date: Apr 23

Time: Tu 8:30am-10:30am

Location: TBA *Please see Web Advisor closer to the date of scheduled final for location.*

To understand rules and regulations regarding Examinations students are encouraged to read [Student's Responsibilities](#)

If the student is unable to meet the final exam requirements due to medical, psychological or compassionate circumstances they are encouraged to review Student's Responsibilities in the [Academic Consideration, Appeals and Petitions](#) section of the Academic Calendar.

Alternative Grading Scheme

THIS SYLLABUS

In addition to the grading scheme given above in Assessment Breakdown, you will also have your final grade calculated using the grading scheme for STAT*6802 and the highest of the two final grade calculations will be applied as your final grade. The grading scheme for STAT*6802 is:

STAT*6802 GRADING SCHEME:

```
Assignments: 20%
Midterm: 25%
Seminar topic and brief proposal: 5%
Seminar: 25%
Final exam: 25%
```

Last Day to Drop Course

COMMON TEXT

The final day to drop Winter 2024 courses without academic penalty is the last day of classes: April 08

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Course Assessment and Grading Policies

THIS SYLLABUS

Assessment Details

NO LATE WORK WILL BE ACCEPTED.

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

Midterm and Final Exam calculator:

You must have a stand-alone calculator for the midterm and the final exam. You will not be permitted to use a calculator on a laptop computer, smartphone, etc. If you are discovered to be using anything but a stand-alone calculator during the midterm or the final exam, it will be reported as possible academic misconduct.

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*4060 Courselink site. Turnitin, Google, etc. will be used to check for potential plagiarism/copying/lack of independent work. **Late submissions will not be accepted.**

Midterm:

The midterm will be held in class on Thursday February 29. This will **NOT** be an open book midterm. You may use two double-sided 8.5 inch x 11 inch sheets of paper as summary sheets. You will need a stand-alone calculator. If you must miss the midterm for **an exceptional reason (i.e., illness)**, the weight of the missed midterm will be added to the final exam weight. For this policy to be applied, you must contact the instructor with a request to apply this policy as close as possible to the date of the missed midterm.

Seminar topic and brief outline and Seminar:

The seminar will be on the results of a data analysis of your choice that is relevant to course topics beyond linear regression. The goal of the seminar is to present details of the application of a statistical method or a comparison of results from applying different methods.

A brief seminar proposal (no more than 1 page) of your topic must be submitted using the Dropbox option on the STAT*4060 Courselink site by the indicated deadline. **Late submissions will not be accepted.**

Seminars will be held during the final two weeks of the course. The seminar should last 15 to 20 minutes, not including questions. Marks will be given for answering questions and asking questions of other students. You are expected to attend all student seminars.

References to all sources of information must be briefly included in slides but also given as a final slide that includes detailed references. The file containing your slides must be submitted to the Dropbox in Courselink just prior to your seminar. **Late submissions will not be accepted.**

Please see the grading rubric on the Courselink site for guidance when preparing your seminar.

Your seminar outline and presentation slides must be in your own words. Turnitin, Google, etc. will be used to check for potential plagiarism/copying/lack of independent work.

Final exam:

Date: Apr 23

Time: Tu 8:30am-10:30am

Location: TBA Please see Web Advisor closer to the date of scheduled final for location.

It is required that you write the final exam at the assigned date/time. This will **NOT** be an open book exam. You may use three double-sided 8.5 inch x 11 inch sheets of paper as summary sheets. You will need a stand-alone calculator. If you miss the final exam for any reason, you must see your program counsellor. University regulations require specific procedures to be followed regarding the conduct of final exams, including recourse, if any, for missed final examinations. These procedures are out of my control.

Course Standard Statements

COMMON TEXT   Content removed by user.

Open Text Field #2

COMMON TEXT   Content removed by user.

Standard Statements for Undergraduate Courses

COMMON TEXT

⊕ **Academic Integrity**

⊕ **Accessibility**

⊕ **Accommodation of Religious Obligations**

⊕ **Copies of Out-of-class Assignments**

⊕ **Drop Date**

⊕ **Email Communication**

⊕ **Health and Wellbeing**

⊕ **Illness**

⊕ **Recording of Materials**

⊕ **Resources**

⊕ **When You Cannot Meet a Course Requirement**