

University of Guelph
Department of Mathematics and Statistics
Course Outline: Stat*6950 Fall 2020
Statistical Methods for the Life Sciences

Disclaimer:

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website <https://news.uoguelph.ca/2019-novel-coronavirus-information/>

General Information

Course Title: Stat*6950: Statistical Methods for the Life Sciences

Course Description: Analysis of variance, completely randomized, randomized complete block and latin square designs; planned and unplanned treatment comparisons; random and fixed effects; factorial treatment arrangements; simple and multiple linear regression; analysis of covariance with emphasis on the life sciences. STAT*6950 and STAT*6960 are intended for graduate students of other departments and may not normally be taken for credit by mathematics and statistics graduate students.

The above is the official description in the course calendar. I will be adding some extra content that I think you should know, such as categorical data analysis and some nonparametric methods.

Credit Weight: 0.5

Academic Department (or campus): Mathematics & Statistics

Campus: University of Guelph

Semester Offering: Fall 2020

Class Schedule and Location: The current COVID-19 pandemic necessitates remote delivery of the course. Currently I have reserved Mondays at 10:00AM-10:50PM for “synchronous” delivery of lecture material via Zoom or some similar platform. Every effort will be made to record and post all synchronous lectures, but you will want to try to take in each of these lectures as they take place. The other two lectures each week will be delivered asynchronously; that is they will be recorded in advance and available on or before Wednesday and Friday at 10:00AM.

Instructor Information

Name: Gary J. Umphrey

Email: umphrey@uoguelph.ca

Office Phone: (519) 824-4120 x53288 (voice mail here)

Office location and office hours: My office is in MacNaughton 551, but it seems unlikely that I will be allowed to hold office hours or otherwise meet students there. I will have some remote office hours via Zoom (or similar platform), schedule T.B.A.

GTA Information

Name: Matthew Lowe

Instructor Email: mlowe02@uoguelph.ca

Course Content

Specific Learning Outcomes:

I try to optimize the educational outcomes for each student in the course. Specifically some of the outcomes I consider desirable are:

- Improve your ability to understand, implement and interpret core statistical methodologies, especially in the areas of regression analysis and experimental design.
- Improve your capacity to design experiments and other research studies that will require subsequent quantitative analysis.
- Understand statistical language as employed in your research area and in science in general.
- Improve your capacity to communicate statistical results to other scientists.
- Gain a deeper understanding of the role of statistical inference within the broader sphere of scientific inference.
- Gain an appreciation of some interesting statistical controversies!

Lecture Content:

Lectures vary a lot in style and content, you will need to follow the course through Courselink as it progresses through the semester.

Labs:

This course does not have a lab, but you will be working with hands-on statistical analyses using R statistical software during at least some of the synchronous classes. Make sure to install the latest version of R on your computer. There will be remote TA support to assist you with difficulties you encounter with R.

Course Assignments and Tests:

There will be no standard tests or final exam in this course for the Fall 2020 semester. Evaluation will be based entirely on six assignments. The assignments may have individual or group work components (or both). Assignment questions will be posted on Courselink. At least part of each assignment will be posted at least one week before the assignment is due, but questions can be added to any assignment up to 72 hours before the assignment is due.

Your solutions will be submitted electronically, through one or more platforms such as Crowdmark or Courselink. Details of the submission process will be explained for each assignment.

The six assignments will contribute equally towards your final grade.

Assignment due dates are: Assignment #1: Friday September 25
Assignment #2: Friday October 9
Assignment #3: Friday October 23
Assignment #4: Friday November 6
Assignment #5: Friday November 20
Assignment #6: Friday December 4 (last class day)

Final examination date and time:

There will be no final exam in this course for the Fall 2020 semester,

Course Resources

Required Texts:

We will make use of texts made available electronically through the library or elsewhere online; these have no cost to you. Here are two very useful books that are available through the University of Guelph Library:

Regression Analysis by Example, 4th ed., by S. Chatterjee & A. S. Hadi (Wiley, 2006). Good chapters to download include 1–6, 11, and 12.

Design and Analysis of Experiments in the Health Sciences, by G. Van Belle and K. Kerr (Wiley, 2012). Good chapters to download include 1-5.

In addition to the mentioned chapters, you may want to download the pdfs for the front and back materials. Indeed you might want to download the entire book contents.

Another good book for the Experimental Design part of the course is Gary Oehlert's (2000) text, "A First Course in Design and Analysis of Experiments", which Dr. Oehlert has generously made available for free as a pdf download. You can find the link here:

<http://users.stat.umn.edu/~gary/Book.html>

Recommended Texts:

At various times I will recommend other potentially useful texts.

Other Resources:

I will be providing other materials (all accessible electronically) as we move through the course.

Course Policies

Grading Policies

Assignments will be submitted electronically, details to be posted on our course website. Deadlines are strictly enforced, unless I decide otherwise. A penalty of 10% per day can be imposed for late assignments. An assignment cannot be submitted after graded assignments are returned to the class. An unsubmitted assignment without an approved request for academic accommodation will receive a grade of 0. If an assignment cannot be submitted but has an approved request for academic consideration, a substitute assignment (not necessarily of the same format as the original assignment) will be provided.

Remember that a graduate course, including this one, requires a minimum grade of 65% to pass.

Course Policy on Group Work:

Some assignments may allow or require group work on one or more components. Explicit rules for such components can vary and will be detailed with the assignment guidelines.

Course Policy regarding use of electronic devices and recording of lectures

Recordings and other course materials 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

I am a strong proponent of live lectures as part of the learning experience within a vibrant campus environment, but the COVID-19 pandemic requires that we adapt to current and (rather uncertain) future circumstances. After all, you don't want to waste time as you work towards completing your graduate degree! I have taught this course in the past, and I am confident that this will be a good course to take remotely. It will not be as tightly structured as many online

courses are, rather I will be attempting to capture the experience of taking a “live” lecture course as much as possible.

The course is designed so that you can take it wherever you are living, whether this is in Canada or in another country. You will need a computer with internet access, but I will be structuring the assignments so that there is some leeway for working around inevitable internet access issues.

For those living in or near Guelph in the Fall 2020 semester, I hope to have at least a couple of face-to-face meetings, provided that such meetings can be done safely for all involved. To do so can only be done with the approval of various higher levels of administration, and this can't be counted on at this time – but I will be looking into it.

Course Evaluation Information

Please see:

https://mathstat.uoguelph.ca/sites/uoguelph.ca.mathstat/files/public/TeachevaluationformW16_1.pdf

Drop date

The last date to drop one-semester courses, without academic penalty, is **Friday, December 4, 2020**. For regulations and procedures for Dropping Courses, see the Academic Calendar:

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

University Policies

E-mail Communication

As per university regulations, all students are required to check their <mail.uoguelph.ca> 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. [See the Graduate calendar for information on regulations and procedures for Academic Consideration.](#)

The University will not normally require verification of illness (doctor's notes) for fall 2020 or winter 2021 semester courses. However, requests for Academic Consideration may still require medical documentation as appropriate.

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.

More information: www.uoguelph.ca/sas

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.](#)

Recording of Materials

Presentations which 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.

Resources

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

Recording of Lecture Materials

By enrolling in a course, unless explicitly stated and brought forward to their instructor, it is assumed that students agree to the possibility of being recorded during lecture, seminar or other "live" course activities, whether delivery is in-class or online/remote.

If a student prefers not to be distinguishable during a recording, they may:

1. turn off their camera
2. mute their microphone
3. edit their name (e.g., initials only) upon entry to each session
4. use the chat function to pose questions.

Students who express to their instructor that they, or a reference to their name or person, do not wish to be recorded may discuss possible alternatives or accommodations with their instructor.