

University of Guelph
Department of Mathematics and Statistics
Course Outline: Stat*6950 Fall 2022
Statistical Methods for the Life Sciences

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 2022

Class Schedule and Location: Lectures are scheduled on Tuesday and Thursday from 10:00AM to 11:20AM. The lectures are scheduled will primarily (and possibly entirely) be delivered as “face-to-face” lectures. The course will be held in MCKN 121, at least initially; I am hoping to get a change to a room with two projectors and two screens. Face-to-face lectures will not be recorded.

Instructor Information

Name: Gary J. Umphrey

Email: umphrey@uoguelph.ca

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

Office location and office hours: Office hours are T.B.A. My office is in MacNaughton 551, but I may not be holding all office hours there. I will have some remote office hours via Zoom (or similar platform); these are scheduled rather flexibly throughout the

semester. Whenever possible I will meet with students after our face-to-face classes to answer questions. We may take advantage of outdoor areas to meet if the weather is suitable.

GTA Information

Name: Alysha Cooper

Instructor Email: stat6950@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 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. Make sure to install the latest version of R or R-Studio on your computer. There will be TA support to assist you with difficulties you may encounter with R.

Course Assignments and Tests:

Assignments will be given throughout the semester, but these will not be graded. Evaluation will be based entirely on two tests and a final exam. The tests and final exam will focus on assignment and lecture content.

The two tests will each be worth 30% of your final grade, and the final exam will be worth 40% of your final grade.

Tentative test dates are: Test 1: Thursday October 6
 Test 2: Tuesday November 8

Final examination date and time:

The date, time, and place of the final exam needs to be confirmed. Tentatively, Tuesday December 6 looks like a good day to hold the final exam in this course. Details will be confirmed on CourseLink ASAP.

Course Resources

Required Texts:

We will make use of texts made available electronically through the library or elsewhere online.

For the regression part of the course: *Regression Analysis by Example*, 4th ed., by S. Chatterjee & A. S. Hadi (Wiley, 2006). Good chapters to download include 1–6, 11, and 12. This book is available free through the University of Guelph Library.

For the experimental design part of the course: *A First Course in Design and Analysis of Experiments*, by Gary Oehlert (2000). Dr. Oehlert has generously made his book 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 as we move through the course. However, I rarely provide notes, as I consider note-taking to be an essential skill that most of us need to cultivate.

Course Policies

Grading Policies

If you miss a test or the final exam, I will try to provide an alternative test or exam for you. I cannot guarantee that this will occur during the current semester.

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

Course Policy on Group Work: Not applicable.

Course Policy regarding use of electronic devices and recording of lectures

Recordings and other course materials 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 has required that we continue to adapt to current and (rather uncertain) future circumstances. Hopefully, we are now past the worst of the pandemic, and we will be able to maintain face-to-face classes throughout the semester. However, it is possible that some remote components will be included.

University Policies

Email Communication

As per university regulations, all students are required to check their <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 Undergraduate Calendar for information on regulations and procedures for Academic Consideration.

Drop Date

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar.

Copies of Out-Of-Class Assignments

Not applicable.

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 make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

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 outlined in the Undergraduate 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.

Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via Courselink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

COVID-19 Safety Protocols

For information on current safety protocols, follow these links:

<https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-your-safe-return/>

<https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, that these guidelines may be updated as required in response to evolving University, Public Health or government directives.