

Course Outline Form: Fall 2022

General Information

Course Title: STAT*2050: Statistics II

Course Description: In this course, students will learn how to implement good study design and analyze data from complex studies. This course follows naturally from STAT*2040 and features both previously unseen statistical techniques, as well as studying in greater depth some topics covered in STAT*2040. These topics will include: experiments and observational studies; a review of t-tests and confidence intervals; confounding variables; association and causality; Analysis of Variance (ANOVA); simple and multiple linear regression; binary responses (logistic regression); odds ratios and relative risk; and an introduction to experimental design (including blocked designs and factorial treatment designs). Assignments carried out using modern statistical software will form the basis for mastering the material.

Prerequisites: STAT*2040

Exclusions: STAT*2090

Credit Weight: 0.5 credit

Academic Department (or campus): Mathematics & Statistics

Campus: Guelph

Semester Offering: Fall

Class Schedule and Location: Monday/Wednesday/Friday, 9:30 – 10:20am in ROZH 103

Instructor Information

Instructor Name: Dr. Lorna Deeth

Instructor Email: Ldeeth@uoguelph.ca

Office location and office hours: MACN 548. Office hours are Monday & Wednesday, 10:30 – 11:30am. For the most part, I will try to stay after class to answer most questions. If you visit my office, you may be asked to put on a mask. If you are visiting my office and find yourself waiting in the hallway, I ask that you consider wearing a mask as a courtesy to other members of the Department whose offices are in the same hallway.

Course Content

Specific Learning Outcomes:

By the end of this course, students should be able to:

- choose an appropriate statistical inference procedure in a variety of situations, carry out the procedure, and effectively communicate a proper interpretation of the results.
- design basic experiments and other research studies.
- discuss the advantages and disadvantages of various study designs.
- demonstrate an understanding of the limitations and uncertainties associated with statistical models.
- discuss the assumptions of statistical models, investigate these assumptions using appropriate plots and statistics, and discuss the implications of violations of those assumptions.
- discuss and critique statistical analyses and conclusions in published research papers.
- demonstrate competence in using statistical software to implement statistical procedures.

Lecture Content:

The lecture content will cover the topics of:

- experiments and observational studies; association and causality; confounding variables;
- a review of statistical inference using t procedures;
- Analysis of Variance (ANOVA);
- simple and multiple linear regression;
- logistic regression (binary response);
- odds ratios and relative risk;
- introductory concepts in experimental design: completely randomized designs, randomized complete block designs, and factorial designs.

Course Assignments and Tests:

Course Component	Date	Time	Location	Weight
Assignment 1	Friday, September 30	Due by 11:59pm	Online	15% each TOTAL: 45%
Assignment 2	Friday, October 28	Due by 11:59pm	Online	
Assignment 3	Friday, November 25	Due by 11:59pm	Online	
Term Test #1	Friday, October 14	9:30 – 10:20am	In class	Best Test: 15% Worst Test: 10% TOTAL: 25%
Term Test #2	Friday, November 11	9:30 – 10:20am	In class	
Final Exam	Wednesday, December 14	11:30am – 1:30pm	TBA	TOTAL: 30%

Course Resources

Text: There is no required textbook for this course, as the course notes will serve as the primary resource for students. However, students are encouraged to access the following textbooks as additional resources:

Regression Analysis by Example, 4th Edition. (2006). Chatterjee, S. & Hadi, A.S.
(available via ARES Course Reserve; see Courselink or the U of G Library)

Design and Analysis of Experiments in the Health Sciences (2012). Van Belle, G. & Kerr, K.
(available via ARES Course Reserve; see Courselink or the U of G Library)

A First Course in the Design and Analysis of Experiments (2010). Oehlert, G.W.
(freely available at <http://users.stat.umn.edu/~gary/Book.html>)

A Beginner's Guide to R (2009). Zuur, A.F., Ieno, E.N., & Meesters, E.H.W.G.
(available via ARES Course Reserve; see Courselink or the U of G Library)

Introductory Statistics Explained (2015). Balka, J.
(available as a PDF on the Courselink site)

Other Resources:

Lecture notes: A weekly set of incomplete lecture notes will be posted on Courselink. It is expected students will have a copy of these notes available, and will fill them in during lectures. Completed lecture notes will not be posted online.

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

R/RStudio: This course will exclusively use R/RStudio. If you do not have this software on your personal computer, you can download it for free from:

R: <http://cran.r-project.org>

RStudio: <https://www.rstudio.com>

Make sure you have up-to-date versions of both software!

Learning Centre: Drop-in help is available in the Statistics Learning Centre (Science Commons, 3rd floor of the library) for students seeking help with course content and/or assignments. Students are expected to use the Statistics Learning Centre as a primary resource for help with course material. Hours of operation are:

- Monday/Wednesday: 9:30am – 3:30pm
- Tuesday/Thursday: 10am – 4pm
- Friday: 9:30am – 2:30pm.

R Drop-in Help: There are no labs associated with the course, however students can obtain help using R/RStudio by visiting the TAs during drop-in R/RStudio help in Science Complex (SSC) room 1305. The drop-in help hours are Monday – Friday, 11am – 1pm. Note there are no computers in this room; you will need to bring a laptop with you.

Calculators: Students are strongly encourage to obtain (and know how to use!) a good, multi-variable calculator. Calculators will be needed to write the terms tests and final exam. I also recommend that you bring a back-up calculator to all evaluations. Cell phones, tablets, laptops, etc. will not be allowed as a calculator during a term test or final exam.

Courselink: Course information and resources will be available on Courselink. Students are encouraged to check the website regularly for updated information and announcements.

Course Policies

Communication Policies: Questions regarding course content, general administrative questions, or anything of a non-personal / private nature should be posted on the Courselink Discussion Boards. This allows all students with similar questions to benefit from the posted answer(s), either from myself or a fellow classmate. Any inquiries sent via email that are general (i.e. not private / personal) will be posted (anonymously) on the Courselink Discussion Board for response.

Private inquiries or issues, or a request for an additional meeting, can be sent via email. Emails must be sent from your University of Guelph email account 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.

Grading Policies:

Assignments: Details regarding each of the assignments will be posted on Courselink. These must be handed in by the posted due date/time. Late assignments will be accepted at a penalty of 5% per day late, up to a maximum of three days after the posted deadline. Assignments submitted beyond the three-day grace period will receive a grade of 0. **NO EXCEPTIONS.**

Assignments can be completed independently or with a partner; groups of 3 or more students are not permitted. Any unauthorized collaboration, completing another student's work, or having another student complete your work, will constitute academic misconduct and will be charged as such.

Turnitin: In this course, we will be using Turnitin, integrated with Gradescope, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph.

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.

Assignments that are flagged on Turnitin will be subject to further examination, however this does not automatically mean that academic misconduct has occurred. In the event that a more detailed examination does in fact suggest academic misconduct may have occurred, an official investigation will be launched through the CEPS Dean's Office.

Term Tests: Term tests are scheduled during class time, and therefore no student should have a conflict with a test. If a conflict does exist, **it is your responsibility to resolve it.** Students who miss a test for medical illness must contact me within 3 business days of the missed test. In the case of absence due to medical illness, you may be required to complete an alternative assessment in a format of my discretion. If you cannot write a test for mental health reasons or are seeking accommodation on compassionate grounds, you must speak with your Program Counsellor (and include them in all communication with me) before any accommodations will be considered.

The final exam (date, time, and location) is scheduled by the Registrar's Office. Students who miss the final exam due to a valid, documented reason must contact their Program Counsellor for advice on University regulations regarding final exams. These procedures are based on University policy, and are not under the control of the course instructor.

For the term tests, students are permitted **one** double-sided 8.5" x 11" (letter size) reference page for Term Test #1, **two** such pages for Term Test #2, and **three** such pages for the final exam. You are free to write whatever you would like on your reference pages however, your pages must be hand-written; no scanned images, typed text, etc. will be allowed, and reference pages that violate this rule will be confiscated during the test/exam.

Regrade and Accommodation Request Policies:

Regrade requests must be submitted within two weeks of an assignment or test being returned, after which regrade requests may no longer be submitted, and the assignment or test grade is considered final. Note that if a student submits a test or assignment for regrading, I reserve the right to regrade the entire test/assignment, not just the question under consideration. Procedures for submitting a regrade request will be posted on Courselink.

Requests for accommodation due to illness, personal circumstances, etc. should be made before the assessment is due. If this is not possible, the request should be made within 3 business days of the due date / test date. Accommodation will be provided at my discretion and should not be assumed. In the event that an accommodation is not granted, students will be expected to complete the test or assignment.

Course Policy on Group Work:

Students are encouraged to work together to discuss course content, share ideas, and ask/answer questions. However, all term tests and the final exam are to be completed independently.

The assignments can be completed individually or with a partner, with explicit instructions regarding this group work posted on Courselink. Note that in the event one group member is unable to complete an assignment (due to illness, personal circumstances, etc.), the remaining partner will be expected to complete and submit the assignment with the unavailable partner removed.

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

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. This includes on-campus scheduling during the semester, midterms and final examination schedules. All University-wide decisions will be posted on the [COVID-19 website](#) and circulated by email.

COVID-19 Safety Protocols:

For information on current safety protocols, follow these links:

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

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

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

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. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

Accommodation due to 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).

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:

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 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 Integrity:

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 encourages academic integrity. 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.

Undergraduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

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 student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted. Recorded material that is posted on Courselink or elsewhere cannot be redistributed without the permission of the Instructor.

Resources:

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>

Mental Health Services:

One out of every five students in Canada experiences some sort of mental health issue at some point in their academic career. If you find yourself facing a mental health crisis, or just need to talk to someone, please consider taking advantage of one of the following resources available to University of Guelph students:

Counselling Services: Visit the Counselling Services website (<https://wellness.uoguelph.ca/counselling>) to get information on resources available to you, both online and in-person. You can also visit them at Health Services (J.T. Powell Building, ext 53244) where they offer individual and group counselling sessions by appointment or walk-in.

Student Support Network: is located in the Wellness & Education Promotion Centre in the J.T. Powell Building and offers confidential, peer-based, drop-in support.

Good2Talk: ([1-866-925-5454](tel:1-866-925-5454)) is a free, 24/7 student hotline that provides professional counselling and referrals for mental health, addictions and well-being.

Here 24/7: ([1-844-437-3247](tel:1-844-437-3247)) specializes in assessment, referral and appointment booking and is available 24/7 for crisis support.

You are not alone and you will not be judged for asking for help.