

STAT*2050 Statistics II, Winter 2019

1 General Information

Course Title: STAT*2050-Statistics II

Course Description: This course introduces concepts, ideas, and methods of how to implement a good study design and analyze data collected from different 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: experimental 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; and an introduction to experimental design including completely randomized design, blocked designs and factorial treatment designs. Assignments carried out using modern statistical software will form the basis for data analysis and mastering the material.

Prerequisites: 1 of STAT*2040, STAT*2060, STAT*2120, STAT*2230

Exclusions: STAT*2090

Credit Weight: 0.5 credit

Academic Department (or campus): Mathematics & Statistics

Campus: Guelph

Semester Offering: Winter

Class Schedule and Location: Monday, Wednesday, Friday, 8:30am-9:20am in THRN 1200.

2 Instructor and Teaching Assistant Information

Instructor: Prof. Zeny Feng

Email: zfeng@uoguelph.ca

Phone: ext 53294 (no voicemail please!)

Office location: MACN 540

Office hours: Monday and Wednesday, 9:30-10:30am, Tuesday 10-11am.

3 Course Content

Specific Learning Outcomes:

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

- explain the design of some basic experiments and observational studies, and describe how statistical conclusions differ between experimental and observational studies.
- choose an appropriate statistical inference procedure in a variety of situations, carry out the procedure, and effectively communicate a proper interpretation of the results.
- explain the concepts of simple linear, multiple linear, and identify when it is appropriate to use each method of analysis, and appropriately interpret the results of the analysis.
- identify various types of simple experimental designs, carry-out the corresponding statistical analysis, and provide proper interpretation of the results.
- carry out the calculations for statistical inference procedures, regression analysis, and basic experimental design calculations using appropriate statistical software.

Lecture Content:

The lecture content will cover the topics of:

- concepts 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;
- introductory concepts in experimental design: completely randomized designs, randomized complete block designs, and factorial designs.

Course Assignments and Tests:

This is a tentative schedule. The assignment due dates and test dates are subject to change.

Course Component	Due Date	Location	Weight
Assignment 1	Friday (Jan 25)	Crowdmark	5%
Assignment 2	Friday (Feb 15)	Crowdmark	5%
Assignment 3	Friday (Mar 15)	Crowdmark	5%
Assignment 4	Wednesday (Apr 3)	Crowdmark	5%
Test 1	Friday (Feb 1, 8:30-9:20)	In Class	20%
Test 2	Friday (Mar 1, 8:30-9:20)	In Class	20%
Final Exam	Tuesday (Apr 9, 11:30-13:30)	TBA	40%

4 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 online textbooks or hard copies (and corresponding chapters), available through the University of Guelph Library, as additional resources:

- The Statistical Sleuth: A Course in Method of Data Analysis, 2nd Edition. (2002). Ramsey F. L. and Schefer D. W..
- Regression Analysis by Example, 4th Edition. (2006). Chatterjee S. and Hadi A.S. (Chapters 1 - 6, 12).
- Design and Analysis of Experiments in the Health Sciences (2012). Van Belle G. and Kerr, K. (Chapters 1 - 5).

Lecture Note: A complete set of lecture notes will be posted on CourseLink before the term start. It is expected that students will bring in a copy of these notes and we will fill them in during lectures. Completely filled lecture notes will not be posted online.

The Lecture notes are not to be re-distributed in any form.

Computer Software: The primary statistical software package that will be used in this course is R, which is freely available for download at <http://www.r-project.org/> Students are strongly encouraged to install R on their personal computers.

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. Hours of operation are Monday/Wednesday: 9:30am - 3:30pm, Tuesday/Thursday: 10am - 4pm, Friday: 9:30am - 2:30pm. Students are expected to use the Statistics Learning Centre as a primary resource for help with course material.

R Drop-in Help: There are no labs associated with the course; however students can obtain help using R by visiting the TAs during drop-in R help in the Science Complex computer labs. The drop-in help hours are 1:30pm - 3:30pm daily, in SSC 1303.

CourseLink: Course information and material (such as assignments, data sets, etc.) will be available on CourseLink. Students are responsible to check the website regularly for updated information and announcements.

5 Course Policies

Grading Policies

There will be 4 assignments throughout the semester. Assignment will be submitted electronically through the Crowdmark system. **No late assignments will be accepted, and late or missed assignments will automatically receive a grade of 0.** Assignments will be marked by TAs and returned through Crowdmark system. Therefore, queries on assignments should be presented to the TA.

All two term tests will be held during the class time, and therefore no student should have a conflict with the date or time. If a conflict does exist, it is your responsibility to resolve it immediately. Students who miss the midterm for a valid, documented reason (such as a medical illness) must contact me within 3 business days of the midterm, and provide the appropriate documentation. In this situation, the weight of the missed test will be added to the final exam.

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.

In order to uphold the University of Guelph's academic integrity standards, the written components from both term tests will be scanned and digitally stored before graded tests are returned to the students. Any work

that is submitted for regrading will be compared to the corresponding digital copy to ensure no changes have been made. Note that in the event that a student submits a test for regrading, I reserve the right to regrade the entire written component of the test, not just the question under consideration.

Course Policy on Group Work:

Students are encouraged to work together to discuss course content, share ideas, and ask/answer questions. However, all submitted work must be done independently unless it is explicitly stated students are allowed to submit collaborative work. Completing another student's work, or having another student complete your work, will constitute academic misconduct.

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.

6 University Policies

Academic Consideration:

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id number, and e-mail contact. See the academic calendar for information on regulations and procedures for academic consideration:

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

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

Accessibility:

The University of Guelph is 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 the Centre for Students with Disabilities as soon as possible.

For more information, contact CSD at 519-824-4120 ext. 56208 or email: csd@uoguelph.ca or see the website: <http://www.uoguelph.ca/csd/>

Course Evaluation Information:

Please see <http://www.mathstat.uoguelph.ca/files/TeachevaluationformF10.pdf>

Last day to drop the course: Friday, March 8, 2019.