

STAT*2050 Statistics II, Winter 2020

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

Class Schedule and Location: MWF, 8:30am-9:20am in ALEX 200.

Final Exam: April 6, 8:30-10:30am, location TBA

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: MW 1-2pm, F 10-11am.

Teaching Assistants: TBA

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	Wed (Jan 15), 11:59pm	Online on Courselink	2.5%
Assignment 2	Wed (Jan 22), 11:59pm	Online on Courselink	2.5%
Assignment 3	Wed (Jan 29), 11:59pm	Online on Courselink	2.5%
Assignment 4	Fri (Feb 14), 11:59pm	Online on Courselink	2.5%
Assignment 5	Fri (Feb 28), 11:59pm	Online on Courselink	2.5%
Assignment 6	Fri (Mar 13), 11:59pm	Online on Courselink	2.5%
Assignment 7	Fri (Mar 20), 11:59pm	Online on Courselink	2.5%
Assignment 8	Fri (Mar 27), 11:59pm	Online on Courselink	2.5%
Assignment 9	Fri (Apr 3), 11:59pm	Online on Courselink	2.5%
The best 8 assignments are counted, so the total for assignments is 20%			
Test 1	Friday (Feb 7, 8:30-9:20am)	In Class	15%
Test 2	Friday (Mar 6, 8:30-9:20am)	In Class	25%
Final Exam	Monday (Apr 6, 8:30-10:30am)	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: An (in)complete set of lecture notes is available from the bookstore in advance of lectures. It is expected that students will bring a copy that can be completed 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 (<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 TBA.

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.

An online discussion board will be available on Courselink. They are only to be used for course-related matters. Students are encouraged to help each other understand concepts and discuss assignment questions, however students are not allowed to share answers. The discussion board will be monitored for accuracy and content.

Scientific Calculators: Students are encouraged to have available a standard scientific calculator which is allowed for all exams. Graphing and programmable calculators are not allowed.

5 University Policies

Email Communication:

As per university regulations, all students are required to check their 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 in writing, with your name, id number, 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>

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 Policy regarding use of electronic devices and recording of lectures:

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.

Course Evaluation Information:

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

Last day to drop the course:

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

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

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>