

Fall 2018

Statistical Science 3843A - Introduction to Study Design

Instructor Information

Instructor	Chelsea Uggenti
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Office Hours	TBD, or as announced in class/on OWL and by appointment

Course Information

Course Description	A case study approach to how data are collected in science, social science and medicine, including the methods of designed experiments, sample surveys, observational studies and administrative records.
Prerequisites	A minimum mark of 60% in Statistical Sciences 2858A/B
Pre,Co-requisites	Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. You can be deregistered at any time even after writing the final exam. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.
Warning	
Lecture Hours	Mon, Wed, Fri 8:30 AM – 9:30 AM in WSC 240
Course Website	Students should check OWL (https://owl.uwo.ca/) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

Course Materials

There is no assigned textbook for the course. The core lecture notes will be available on the OWL course website.

Supplementary References:

The following textbooks are on reserve in the Taylor Library:

- Montgomery, D. C. (1997). *Design and analysis of experiments*. New York: Wiley.
- Montgomery, D. C. (2009). *Design and analysis of experiments*. Hoboken, NJ: Wiley.
- Lohr, S. L. (2006). *Sampling: Design and analysis*. Pacific Grove, Calif: Duxbury Press.

Course Objectives

This course provides an introduction to study design. The main components are survey sampling and designed experiments. Other important topics covered include: selection bias and

measurement error, research ethics, observational studies and administrative records. By the end of this course, successful students will be able to:

1. Distinguish between various survey sampling techniques.
2. Identify key concepts of research ethics and explain their importance in real-world surveys/experiments.
3. Analyze data using appropriate methods based on the design of an experiment.
4. Critique the cost-variance trade-off for numerous theoretical study designs.
5. Analyze real-world data sets using the techniques discussed in class with the popular statistical software package R.

Method of Evaluation

Attendance

There will be 7 attendance checks randomly throughout the term. One check for attendance will count towards 1% of your grade – for up to a maximum of 5% of your total grade.

Please note that head counts will be done when attendance takes place. If the number of students in that lecture does not match the number of signatures on that page, the attendance mark will unfortunately not be given to any students present. Be kind to your peers and only sign the attendance sheet for your own name!

Participation

There will be ~7 participation activities throughout the term. One completed activity will count towards 1% of your grade – for up to a maximum of 5% of your total grade.

Further details about these activities will be available on OWL and discussed in class.

In order to receive a “completion” for a participation activity, students must complete an assigned task that demonstrates their engagement with the material (to the instructor’s discretion).

Assignments

There will be 4 assignments each worth 5% (due at the beginning of the lecture). Tentative due dates are:

- Assignment 1 – Wednesday, September 19
- Assignment 2 – Wednesday, October 3
- Assignment 3 – Wednesday, October 31
- Assignment 4 – Wednesday, November 14

Reports

There will be two reports each worth 5% (due at the beginning of the lecture). Tentative due dates are:

- Report 1 – Wednesday, October 17
- Report 2 – Wednesday, November 28

Midterms

There will be two midterm tests. They will be 50 minutes in length during lecture time. The first one will take place on Friday, October 5th and the second one on Friday, November 16th. The

midterm test with the lower grade will be worth 15% and the midterm test with the higher grade will be worth 20%.

In the event that one legitimately misses a test and provides the required supporting documentation, a 50 minute make up test will be held on Friday, November 30th at 7pm. The midterm test with the lower grade will be worth 15% and the midterm test with the higher grade will be worth 20%.

In the event that one legitimately misses both tests and provides the required supporting documentation, a 50 minute comprehensive and cumulative make up test will be held on Friday, November 30th at 7pm, worth 35%

Final Project

The final project will consist of two components (one on survey sampling and one on designed experiments). Specific weights of the components will be determined later.

Evaluation

A final grade, out of 100, will be calculated as listed below.

Component	Value
Attendance	5%
Participation	5%
Assignments (x4)	20%
Reports (x2)	10%
Midterms (x2)	35%
Final Project	25%

A student who chooses to write a midterm test deems themselves fit enough to do so, and must accept the mark obtained.

Missed Midterm Tests

The policy entitled “Missed Midterm or Test” as listed in the section entitled “Department Policy on Missed Course Requirements and Student Health and Wellness” enclosed below will apply to any missed midterm test.

Computing and/or Calculator Requirement

You will require a cordless, non-programmable, scientific calculator for the midterm tests. No other electronic devices may be in your possession during midterm tests except for this simple scientific calculator.

Homework

A list of homework problems will be posted on the course website and it may be updated throughout the term. Solutions to these problems are not to be handed in. However, for most students, working on these problems regularly and diligently is essential to success in the course. In addition to the posted list of homework problems, you are strongly encouraged to attempt additional problems for extra practice (see reserved textbooks)!

Course Policies

1. **Checking Marked Work:** In the event of a question regarding a mark or a final grade, students are responsible for retaining and presenting any graded materials that were returned to the student during the term. Students have one week from the date the material was returned to report any apparent error in the marking and appeal their grade. No marks will be changed after that time. The instructor reserves the right to remark the entire assignment, report, test or project.
2. **Privacy:** The names of student(s) may be divulged in the classroom to other members of the class. Individuals who are concerned about such disclosures should contact the course instructor to identify whether there are any possible alternatives.
3. **Preparing Assignments and Reports:** Submitted assignments and reports may be subject to up to 50% penalty if the following instructions are not followed:
 - Use 8.5 x 11 standard “letter” paper only. Do not use paper torn out of spiral-ring notepads.
 - Answer questions in order.
 - Print your name and student number on the upper right-hand corner of the question sheet.
 - Staple pages together in the upper left-hand corner (do not use paper clips, duotangs, etc).
 - Answer questions neatly and clearly. If you do your assignment in pencil, be sure that the lead is dark enough so that your writing can be easily read. Writing components of assignments and reports must be typed.
4. **Late Assignments and Reports:** Unless otherwise indicated, assignments and reports are to be handed in at the start of class on the day they are due. Assignments or reports submitted after this time may be subject to a 20-percentage point penalty per day (including weekends and holidays). Assignments and reports submitted 5 or more days late will not be graded.
5. **Grades:** Marks will not be disclosed or discussed by email.

Intellectual Property Statement

Course material developed by your instructor is the intellectual property of your instructor and is made available to students enrolled in this course for their personal use in this course. Sharing, posting or selling this material to third parties (i.e., to people outside of those in this course, or to companies, websites, organizations, associations, etc.) is considered an infringement of intellectual property rights.

Department Policy on Missed Course Requirements

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to the Academic Counselling Office of your home faculty as soon as possible. If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in WSC 140, and can be contacted at scibmsac@uwo.ca.

For further information, please consult the university's medical illness policy at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

Student Health and Wellness

As part of a successful student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western's Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page <http://www.music.uwo.ca/>, and our own McIntosh Gallery <http://www.mcintoshgallery.ca>. Information regarding health- and wellness-related services available to students may be found at <http://www.health.uwo.ca/>.

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html.

Accessibility

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

Email Communication

You are welcome to communicate with your instructor by email, but email communication should only be used to provide them with information or to ask a question that requires a brief response. For more lengthy discussions and for discussions on lectures/course material please see your instructor during their scheduled office hours or by appointment. If you do email them, please use your UWO account, as these are often the only emails read (as emails sent from other addresses often get spammed).

Attendance

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Classroom attendance is viewed as an important part of the learning process. Students are advised that excessive absenteeism may result in the student being disbarred from the final exam (see Western Academic Calendar).

Class Environment Policy

The Department has adopted a "Mutual Expectations" policy governing the classroom environment and all work submitted by students. The full text of the policy can be found at: <https://www.uwo.ca/stats/undergraduate/mutual-expectations.html>. In summary, the policy was

developed under the premise that all interactions between students and faculty should be governed by the principles of courtesy, respect and honesty. Students who are in emotional/mental distress should refer to Mental Health @ Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

Academic Integrity

We expect our students to conduct themselves academically in a manner that upholds the integrity and reputation of our academic programs. Cheating on assignments, exams, essays, reports and term papers is considered to be a serious violation of ethical conduct, and will not be tolerated.

Classroom Environment

Registrarial Services: <http://www.registrar.uwo.ca>

Learning-skills services at the SDC: <http://www.sdc.uwo.ca>

Universities Students' Council: <http://westernusc.ca>