

The University of Western Ontario
Department of Statistical and Actuarial Sciences
STATISTICAL SCIENCE 1023/2037 – Fall 2021
Statistical Concepts/Statistics for Health

Instructor: Joseph Raaymakers, M.Sc.
Contact: jraaymak@uwo.ca or via forums in OWL
Office Hours: Online via Zoom (by appointment)
Lectures: Tuesday, 1:30 PM-3:30 PM, WSC 55

Course Description

An examination of statistical issues aiming towards statistical literacy and appropriate interpretation of statistical information. Common misconceptions will be targeted. Assessment of the validity and treatment of results in popular and scientific media. Conceptual consideration of study design, numerical and graphical data summaries, probability, sampling variability, confidence intervals and hypothesis tests.

It's actually more interesting than it sounds...

Prerequisite(s)

None - this is an introductory course in statistics

Anti-requisite(s)

Statistical Sciences 1023A/B and Statistical Sciences 2037A/B are anti-requisite for each other - this course is cross-listed as both.

Students are advised that they are responsible to ensure that they possess the necessary prerequisites (or have written special permission) and that de-registration may occur at any time if they lack the prerequisite or have taken an anti-requisite course.

Course Format

This course is blended, with a mix of online and 'face-to-face' learning. To be successful in the course, students should expect to complete independent study tasks (1–2 h) plus attend the face-to-face class each week.

Course Schedule - Topics and Assessments

A detailed weekly timetable is included on the last page of this syllabus.

Text Book

Seeing Through Statistics, 4th ed., by J. Utts (Cengage Learning).

You may order a desk copy of the textbook from the bookstore or an e-copy from the publisher.

Course OWL Web Page

The web page will contain:

1. A copy of this course outline
2. Updates and information about the course that you need to know
3. Extra readings (for some topics) that will supplement your class notes
4. Lecture slides
5. Content for independent study (lecture videos, readings, etc.)
6. Assignment details
7. Access to quizzes and activities
8. Practice questions
9. Communication tools
10. Marks of assignments and tests as they are marked

Evaluation

Your final course grade will be determined as follows;

	Original	If you do poorly on one test	
Activities	4%	4%	4%
Assignment 1	5%	5%	5%
Assignment 2	5%	5%	5%
Quizzes (10 of them)	8%	8%	8%
In-Class Assessments	8%	8%	8%
Midterm Test 1	14%	8%	16%
Midterm Test 2	14%	16%	8%
Final Exam	42%	46%	46%

The marking scheme that gives a student the higher final mark will be the one used for that student.

Activities

Structure varies; instructions for each activity will be provided on OWL site. Often involves a survey and/or using an applet to collect some data. These allow you to explore concepts in advance of class.

Assignments

Short essays (e.g. less than 2 pages) that describe and critique research originally presented in popular media. These provide an opportunity to read, write about, and critique statistical research.

Quizzes

There will be 10 short online multiple-choice quizzes that will be given throughout the semester. (See Course Schedule for dates.) The goal is to help keep you up to date with the material (so you do not fall behind).

The quizzes are open-book. You are encouraged to make use of my lecture slides and the text when writing the quizzes. However, you must work independently. Before you begin each assessment, you will agree to an Honour Statement. I will be conducting response and cheating analysis after each quiz. Please honour the Honour Statement.

NOTE: There will be NO make-ups for any of the online quizzes. If you miss a quiz (with a valid reason), the weight will be reassigned to the test and exam components.

In-class Assessments

This may include some written reflections and other activities. Further details on this component will be reviewed in class. These provide assessment of understanding, application, and integration of course material.

Midterm Tests

There will be two 1-hour tests scheduled for mid-October and mid-November. Dates TBA. The midterms may either be multiple-choice questions OR a combination of multiple choice and short written answer questions.

NOTE: There will be NO make-up test for any missed tests. If you miss a test (with a valid reason), the weight will be reassigned to the final exam.

Final Exam

The final exam will be a three-hour examination covering all material in the course, with slightly more emphasis on material covered after the midterms. The exam may either be multiple-choice questions OR a combination of multiple choice and short written answer questions. It will be scheduled by the Registrar's office.

Contingency plan for an in-person class pivoting to 100% online learning

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining assessments will also be conducted online as determined by the course instructor.

For midterm tests and examinations this may include assessments being conducted using a remote proctoring service. More information about remote proctoring services is available in the Online Proctoring Guidelines at the following link: <https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf> and the Remote Proctoring at Western website at <https://remoteproctoring.uwo.ca>.

Intellectual Property Statement

Course material (i.e. course content (including lecture notes), videos, solutions, practice questions, quiz/test questions and other supplementary material posted on OWL) is the intellectual property of your instructors and course developers and is made available to your for your personal use in this course. *Sharing, posting, selling or using this material outside your personal use in this course is considered to be an infringement of intellectual property rights.*

Policy on e-mail communication

You are welcome to communicate with your instructor by e-mail, but e-mail 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 e-mail them, please use your UWO account, as these are often the only emails read (as e-mails sent from other addresses often get spammed).

Attendance

The Department of Statistical and Actuarial Sciences views classroom attendance as a very important part of the learning process. Regular engagement with the online course materials and in online tutorials is strongly encouraged. Students are advised that excessive absenteeism may result in being debarred from the final examination (see Western Academic Calendar).

Classroom Environment

The Department of Statistical and Actuarial Sciences 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>].

Although these were developed with a lecture-based course in mind, the spirit of the expectations applies to this course as well. In summary the policies developed are under the premise that all interactions between student and faculty should be governed by the principles of courtesy, respect and honesty.

Students are encouraged to ask questions on the appropriate forums. Do not use course-related OWL Forums for social conversation unrelated to the course. Keep postings to the OWL Forums positive and productive – the OWL Forums are an important component of our learning environment. Inappropriate or disrespectful postings will not be tolerated.

Department Policy on Missed Course Requirements and Student Health and Wellness

If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. During the COVID-19 pandemic, medical notes are not required. Medical absence can be reported through the Student Illness Reporting Tool at https://www.registrar.uwo.ca/academics/academic_considerations/index.html.

If this portal is not available (i.e., if the COVID-19 pandemic has lifted before the end of the course), or if you have missed (or will be missing coursework) for a non-medical reason beyond your control, approval can be granted either through a Self-reported Absence (if the portal is available) or via the Dean's Office/Academic Counselling unit of your Home Faculty. Non-medical reasons must be accompanied by supporting documentation. If you are a Science student, contact information for the Academic Counselling Office for the Faculty of Science is available at <https://www.uwo.ca/sci/counselling/>.

In all cases, you must contact your instructor as soon as possible, and no later than 24 hours after the period covered, to clarify how you will be expected to fulfil the academic expectations you have missed (unless other instructions are indicated in this Course Outline). For further information, please consult the University's policy on academic consideration for student absences:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf

For Final Exam: If you miss the Final Exam, please contact your faculty's Academic Counselling Office as soon as you are able to do so. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

For Midterm Exam: The policy of the Department of Statistical and Actuarial Sciences is that there will be no make-up exams for a midterm missed due to illness. If your accommodation is approved, the weight of the missed midterm will be reassigned to the final exam. If your accommodation is not approved, then you will receive a mark of 0 for your midterm.

If you have any conflict that prevents you from writing a midterm, you must check with your instructor as soon as possible (and prior to the exam) so that alternate arrangements can be made.

For Quizzes: There will be NO make-ups for any of the online quizzes. If you miss a quiz (with a valid reason), the weight will be reassigned to the test and exam components.

Academic Policy

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy, <http://www.uwo.ca/its/identity/activatenonstudent.html>, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

Computer-marked, multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Support Services

Learning-skills counsellors at the Student Development Centre are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling: <http://sdc.uwo.ca/>.

Students who are in emotional/mental distress should refer to Mental Health@Western for a complete list of options about how to obtain help: <https://www.uwo.ca/health/>

Additional student-run support services are offered by the USC: <https://westernusc.ca/your-services/>.

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.

The policy on Accommodation for Students with Disabilities can be found here:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf

The policy on Accommodation for Religious Holidays can be found here:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

APPROXIMATE Weekly Timetable

This schedule is tentative; we occasionally get a little ahead/behind on course topics. Consequently, the timing of Activities and Quizzes will be adjusted to match our progression through the course (and occasionally, quizzes/activities are added/removed). *IS* = Independent Study; *F2F* = Face-to-Face session

Week	Topic(s)	Graded Components	Textbook Reading
Sept 8–17	<i>IS</i> : review the course syllabus <i>F2F</i> : Introduction to course, statistics, and data	<i>Activity</i> : How will you study for 1023/2037?	
Sept 20–24	<i>IS</i> : Sampling & study designs <i>F2F</i> : Selection bias, confounding, & principles of experimental design	<i>Activity</i> : Topic TBA <i>Quiz 1</i> : Sampling strategies <i>Quiz 2</i> : Study designs	Required: Sections 4.6 and 5.3 Suggested: Sections 4.1 to 4.6, Chapter 5
Sept 27–Oct 1	<i>IS</i> : Measurement characteristics <i>F2F</i> : Issues in survey design	<i>Activity</i> : Topic TBA	Required: Section 3.5, p. 56-57, and p. 71 Suggested: Sections 3.1-3.5
Oct 4–8	<i>IS</i> : Canadian research ethics principles <i>F2F</i> : Issues with consent and equity	<i>Quiz 3</i> : Research ethics Oct 5 at 1:30 pm: In-class Assessment 1	Suggested: Sections 26.1-26.2
Oct 11–15	<i>IS</i> : Measures of shape, centre, & spread <i>F2F</i> : Interpreting & evaluating numerical summaries	<i>Activity</i> : Topic TBA <i>Quiz 4</i> : Numerical summaries Oct 15 by 4:00 pm: Assignment 1 due	Required: Section 7.2, p. 141-146 Suggested: Chapter 7
Oct 15 or 16	Midterm Test 1 (time TBA, you will be assigned a room through Gradebook on our OWL site)		
Oct 18–22	<i>IS</i> : Graphical summaries <i>F2F</i> : Interpreting & evaluating graphs	<i>Quiz 5</i> : Graphical summaries	Required: Section 9.1 to 9.5
Oct 25–29	<i>IS</i> : Correlation & Linear regression <i>F2F</i> : Interpreting correlations & regressions	<i>Quiz 6</i> : Correlation & linear regression Oct 26 at 1:30 pm: In-Class Assessment 2	Required: Sections 10.4 and 11.3 Suggested: Sections 10.3 and 10.4, 11.1 to 11.4
Nov 1–5	Reading week (no classes)		
Nov 8–12	<i>IS</i> : Two-way tables, risks, & odds <i>F2F</i> : Interpreting risks & odds	<i>Activity</i> : Topic TBA <i>Quiz 7</i> : Two-way tables	Suggested: Sections 12.1 to 12.3
Nov 12 or 13	Midterm Test 1 (time TBA, you will be assigned a room through Gradebook on our OWL site)		
Nov 15–19	<i>IS</i> : probability, Normal curves, and z-scores <i>F2F</i> : Problems with probability; 69-95-99.7 rule	<i>Quiz 8</i> : Probability and Normal distributions	Required: Sections 14.3, 14.4, 16.1 to 16.4, 16.6, 17.2, 17.3 Suggested: Chapter 8, Sections 14.1, 14.2, 14.4, 14.6, 16.1, 16.3. 16.4, 16.6, 17.2 to 17.5
Nov 22–26	<i>IS</i> : Sampling variability & sampling distributions <i>F2F</i> : properties of sampling distributions; confidence intervals	<i>Activity</i> : Topic TBA <i>Quiz 9</i> : Sampling variability Nov 23 at 1:30 pm: In-Class Assessment 3	Suggested: Chapter 19, p. 408-410, sections 19.3, 19.4, 20.1, 20.2, p. 438-439, 21.1, 21.4.
Nov 29–Dec 3	<i>IS</i> : Hypothesis testing vocabulary and process <i>F2F</i> : Understanding P-values, power, effect size, and type I/II errors	<i>Activity</i> : Topic TBA <i>Quiz 10</i> : Hypothesis testing	Suggested: Chapter 22, section 23.3, 24.1 to 24.4
Dec 6–8	<i>IS</i> : Seven critical components for critiquing statistics in the media <i>F2F</i> : Applying the seven critical components	<i>Activity</i> : Topic TBA Dec 8 by 4 pm: Assignment 2 due	Required: Section 2.3 and 2.4 Suggested: Sections 2.1 to 2.4
Dec 10–21	Final Exam period (do not schedule travel until the final exam schedule is posted (expected early October))		