SS 1023B: Statistical Concepts
Course Outline

1. Course Information

Course Information
Term: Winter 2023
Location: WSC 55
Lectures: Monday 3:30-4:20, Wednesday 3:30 – 5:20

List of Antirequisites
Statistical Sciences 2037A/B.

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Dr. Holly Steeves	Holly.steeves@uwo.ca	WSC 233	519-661-2111 x86426	MF 10:00 – 11:00 T 2:00 – 3:00

Students must use their Western (@uwo.ca) email addresses when contacting their instructors and have SS1023 in the subject line.

Personal Teaching Approach
I believe that students learn best in an inclusive, welcoming environment that sparks questions, discussions and respect from all sides. For this reason, a typical class will involve a lecture period discussing and explaining the material, broken up with non-graded check ins (through the use of iClicker) to assess student understanding. Examples will be used both as part of the lectures, and part of active learning, where the students get time to practice the problems themselves. In cases where feedback from the assessment is immediate (such as with iClicker), the lecture may be tailored to sections that were most misunderstood. I welcome relevant disruptions to this lecture period such as with questions or discussion topics. I encourage participation and discussions throughout the lectures, and the active learning components. Throughout all of these components, I strive to be respectful to all learners and their individual learning needs, and I expect you to do the same.

Instructor Policies
As mentioned above, I expect respect and inclusivity in our classroom. To promote this, I have several policies that you should follow:
- Please do not be late. If you must be, please enter quietly and choose a seat closest to the door to limit the disruption.
- Put your phones on silent and refrain from being on them. If you must answer your phone, immediately and quietly leave the room. I understand there are sometimes emergencies, but this should not disrupt other students.

- Treat others as you would like to be treated. When speaking for the first time in a new group, introduce yourself with your name, and pronouns if you feel comfortable. Do not judge others for their work in this class, their questions, or anything they choose to share.
- When others are speaking, whether it be instructor or student, listen and do not speak over them.
- Please allow 24 hours for a response via email. I will not be answering emails in the evenings, weekends, or holidays, but I will get back to you as soon as possible. The same should be expected of your peers.

3. Course Syllabus, Schedule, Delivery Mode

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.

Learning Outcomes
By the end of this course, students will be able to
- Use statistical techniques to explore, organize, and describe data.
- Produce data through surveys and experiments.
- Define, explain, and use basic concepts of statistics.
- Define, explain, and use basic concepts of probability and distributions.
- Perform statistical inference including confidence intervals and hypothesis tests.

Key Sessional Dates
Classes begin: January 9, 2023
Reading Week: February 18 – 26, 2023
Classes end: April 10, 2023
Exam period: April 13 – 30, 2023

Week	Dates	Class	Topics	Assessments
1	Jan 9	Course Intro & 1.1	• Syllabus • Key characteristics of datasets	
	Jan 11	1.2	• Graphing categorical and quantitative variables	
2	Jan 16	1.3	• Measures of center • Measures of spread • Boxplots	
	Jan 18	1.4	• Density curves • Normal distributions • Normal Q-Q Plots	
3	Jan 23	2.1 & 2.2	• Examining relationships • Scatterplots • Transformations	

	Jan 25	2.3	• Correlation	
4	Jan 30	2.4	• Least-squares regression • Prediction • Correlation and regression	
	Feb 1	2.5	• Cautions about correlation and regression	
5	Feb 6	2.6 & 2.7	• Contingency tables • Joint distributions • Simpson's paradox • Causation	Assignment 1: Chapter 1
	Feb 8	3.1 – 3.3	• Sources of data • Experiments and randomization • Matched pairs and block designs • Sampling techniques	
6	Feb 13	3.4	• Ethics	
	Feb 15	4.1 & 4.2	• Probability • Sample spaces • Probability rules	Test 1: 7:00 – 9:00 Chapters 1 & 2
7	Reading Week			
8	Feb 27	4.3	• Discrete and continuous random variables Normal Distributions	Assignment 2: Chapter 2 & 3
	Mar 1	4.4	• Mean of a random variable • Law of Large Numbers	
9	Mar 6	4.5	• Probability Rules • Tree Diagrams • Independence	
	Mar 8	5.1	• Sampling Distributions	
10	Mar 13	5.2	• Sampling distribution of a sample mean • Central Limit Theorem	
	Mar 15	5.3	• Binomial Distribution • Normal Approximation • Poisson Distributions	
11	Mar 20	6.1	• Confidence Intervals for population mean • Choosing a sample size	Assignment 3: Chapter 3, 4, 5
	Mar 22	6.2 & 6.3	• Hypothesis testing • Testing for population means • Cautions about hypothesis testing	Test 2: 7:00 – 9:00 Chapters 3, 4, 5
12	Mar 27	6.4	• Decision errors	
	Mar 29	7.1	• T distribution	

			• One sample t CI and test	
			• Matched pairs	
13	Apr 3	7.2	• Two sample testing • Two sample confidence interval • Pooled two-sample procedures	
	Apr 5	7.3	• Sample size for confidence intervals • Power for a significance test	
14	Apr 10	Exam Review		Assignment 4: Chapter 6 & 7

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, affected 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.

4. Course Materials

Required Textbook (we will cover Chapters 1-9)
   Introduction to the Practice of Statistics (Tenth Edition) by David S. Moore, George P. McCabe, and Bruce Craig
Bookstore link

Recommended Online Learning Platform
Achieve for Introduction to the Practice of Statistics integrates outcome-based learning objectives and a wealth of examples with assessment in an easy-to-use interface. Students are provided with rich digital resources that solidify conceptual understanding, as well as homework problems with hints, answer-specific feedback, and a fully worked solutions. https://achieve.macmillanlearning.com/start

Students are responsible for checking the course OWL site (http://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.

All course material will be posted to OWL: http://owl.uwo.ca.

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Assignments (4)   20%
Tests   30%
Final Exam   50%

Assessment Descriptions
- **Assignments will be available on the course OWL site. However, you will not submit your solutions to OWL. Instead, assignments must be submitted through Gradescope,** an online collaborative grading system. It is your responsibility to make sure that your assignment is successfully uploaded and legible. Submissions that cannot be gread by the grader will receive a grade of zero. Assignment questions must be assigned properly to each page or the submission will not be graded.

- After receiving the grades from an assignment, **students will have seven days to submit any regrade requests on that assignment.** After this seven-day period, regrade requests will NOT be accepted. Regrade requests must be made using the Gradescope tool "Regrade Request".

- **Assignment submissions are due 11:55pm (Eastern Time) on the due date.** Assignments that are up to 24 hours late will receive a deduction of 15% on their mark. Late assignments up to 48 hours will receive a deduction of 30% on their mark. No credit will be given for submissions beyond 48 hours of the deadline time unless a valid academic accommodation is obtained.

- Each student will have **2 late coupons** worth 24 hours each that they can use at their own discretion for whatever reason (Note: I do not need to know the reason) towards their assignments. Students can use them together on one assignment for a 48 hour extension, or on separate assignments for 24 hour extensions. **No extensions will be given for any reason beyond the use of late coupons, therefore I suggest saving them until you absolutely need them.**

- Solutions to assignments **will not** be posted; however, TAs will provide comments on incorrect answers using Gradescope, which will allow students to find out the correct solutions. In addition, students can ask the instructor and TAs for more details on solutions via the Regrade Request tool on Gradescope and during office hours.

- There will be **two tests: February 15 and March 22. Both will be from 7:00-9:00 PM.** The locations are yet to be determined. Students will be graded on their best test only. That is, the lowest test mark will be dropped. **This is to account for any absences of any reason. No excuses will be given for missed tests as the lowest mark gets dropped.** All tests are closed book. For each test, students will be allowed **one single sided, letter sized, handwritten cheat sheet. Handwritten means pen to paper, no printing from a computer of any kind.** If any violations are seen in the cheat sheet, it will be taken from the student.

- **Final exam** will be booked by the registrar's office. Students will be allowed **one double sided, handwritten, letter sized cheat sheet. Handwritten means pen to paper, no printing from a computer of any kind.** Again, any violations seen on the cheat sheet and it will be taken from the student.

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

Assessments worth less than 10% of the overall course grade:

The assignments have late coupons to account for any extensions needed, for any reason. No extensions will be given beyond this.

Assessments worth 10% or more of the overall course grade:

For tests, the lowest mark gets dropped, so no tests will be excused. If you miss a test for any reason, that test will count as your dropped test.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (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" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

Note: missed work can *only* be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

7. Accommodation and Accessibility

Religious Accommodation
When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

https://multiculturalcalendar.com/ecal/index.php?s=c-univwo.

Accommodation Policies
Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

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

8. Academic Policies

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

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

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 their official university address is attended to in a timely manner.

A scientific calculator will be allowed on the final exam. A graphics calculator will not be allowed.

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

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

9. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: https://www.uwo.ca/sci/counselling/.

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

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

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 Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (https://learning.uwo.ca) 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.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: https://www.uwo.ca/se/digital/.

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