

## Statistical Sciences 2037A Course Outline

### 1. Course Information

#### Course Information

Statistical Sciences 2037

2022-2023 Fall Term

Format: Blended (online lectures and in-person tutorial)

Lectures: Online (to be recorded and posted on OWL)

Tutorial: In-person on Tuesday, 1:30-3:30 pm, TC 141

#### Antirequisites

Statistical Sciences 1023A/B

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. 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.

### 2. Instructor Information

Instructor: Dr Ricardas Zitikis

E-mail: rzitikis@uwo.ca

Office: WSC 231

Office hour: after the tutorial or by appointment

When contacting the instructor:

- use only Western (@uwo.ca) email address
- **the subject line must contain the course code SS 2037 (due to my teaching of several courses)**

### 3. Course Syllabus, Schedule, Delivery Mode

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. Emphasis will be placed on health-related applications.

## Learning Outcomes

Upon successful completion of this course, students will be familiar with:

- Techniques used in exploring, organizing, and describing data
- Producing data through surveys and experiments
- Basic concepts and uses of statistics
- Basic concepts of probability and distributions
- Statistical inference, including confidence intervals and tests of hypotheses
- Pitfalls and controversies

Classes begin: September 8, 2022

Fall Reading Week: October 31 – November 6, 2022

Classes end: December 8, 2022

Lectures: Online (to be recorded by the instructor and posted on OWL)

Tutorial: In person by the instructor or TAs on Tuesday, 1:30-3:30 pm, TC 141

Week (Mon-Fri)	Textbook	Notes
Sept 8-9	Chapter 1	Looking at data – distributions.
Sept 12-16	Chapters 1-2	Looking at data – relationships.
Sept 29-23	Chapters 2-3	Producing data – designs of experiments and sampling designs.
Sept 26-30	Chapters 3-4	Probability: the study of randomness.
Oct 3-7	Chapters 4-5	Sampling distributions – sample mean.
Oct 11-14	Chapter 5	Sampling distributions – counts and proportions.
Oct 11	TEST 1	A two-hour (two academic hours=100 minutes) test during the tutorial time (1:30-3:10 pm), based on Chapters 1-5. Multiple choice. Closed book. Cumulative. Worth 20% of final grade.
Oct 17-21	Chapter 6	Introduction to inference – confidence intervals.
Oct 24-28	Chapter 6	Introduction to inference – hypothesis tests.
Oct 31-Nov 4		Fall reading week
Nov 7-11	Chapter 7	Inference for means – one mean.
Nov 14-18	Chapter 7	Inference for means – comparing two means.
Nov 15	TEST 2	A two-hour (two academic hours=100 minutes) test during the tutorial time (1:30-3:10 pm), based on Chapters 1-7. Multiple choice. Closed book. Cumulative. Worth 30% of final grade.
Nov 21-25	Chapter 8	Inference for proportions.
Nov 28-Dec 2	Chapters 8- 9	Inference for categorical data – two way tables.
Dec 5-8	Chapter 9	Inference for categorical data – goodness of fit.
TBA	FINAL EXAM	A two-hour (two academic hours=100 minutes) exam. Multiple choice. Closed book. Cumulative. Worth 50% of final grade.

For details on tests 1-2 and the final exam, see **Methods of Evaluation** below. In a nutshell, they are two-hour, multiple choice, cumulative assessments worth 20, 30 and 50% of the final course grade.

## 4. Course Materials

### Required Textbook (we shall cover Chapters 1-9)

*Introduction to the Practice of Statistics* (Tenth Edition) by David S. Moore, George P. McCabe, and Bruce Craig <https://www.macmillanlearning.com/college/ca/product/Introduction-to-the-Practice-of-Statistics/p/1319244440>

Statistics is the science of collecting, organizing, and interpreting numerical facts, which we call data. [...] A knowledge of statistics helps separate sense from nonsense in this flood of data. The study and collection of data are also important in the work of many professions, and training in the science of statistics is valuable preparation for a variety of careers. Each month, for example, government statistical offices release the latest numerical information on unemployment and inflation. Economists and financial advisers, as well as policymakers in government and business, study these data in order to make informed decisions. Doctors must understand the origin and trustworthiness of the data that appear in medical journals. Politicians rely on data from polls of public opinion. Business decisions are based on market research data that reveal consumer tastes and preferences. Engineers gather data on the quality and reliability of manufactured products. Most areas of academic study make use of numbers and, therefore, also make use of the methods of statistics. This means it is extremely likely that your undergraduate research projects will involve, at some level, the use of statistics. (*Introduction to the Practice of Statistics*; page xxiii)

### 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>

### Recommended Supplementary Material

*Statistics: Concepts and Controversies* (Tenth Edition) by David S. Moore and William I Notz <https://www.macmillanlearning.com/college/ca/product/Statistics-Concepts-and-Controversies/p/1319109020>

[It] is a book on statistical ideas and statistical reasoning and on their relevance to public policy and to the human sciences from medicine to sociology. The text includes many elementary graphical and numerical techniques to give flesh to the ideas and muscle to the reasoning. Students learn to think about data by working with data. We have not, however, allowed technique to dominate concepts. The text's intention is to teach verbally rather than algebraically, to invite discussion and even argument rather than mere computation, though some computation remains essential. The coverage is considerably broader than one might traditionally cover in a one-term course, as the table of contents reveals. In the spirit of general education, the authors have preferred breadth to detail. (Publisher's introduction to *Statistics: Concepts and Controversies*.)

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 materials 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.

### Technical Requirements

Stable internet connection, Google Chrome or Mozilla Firefox browsers to optimally use OWL; update your browsers frequently. You will need:

- a laptop or a computer
- a working microphone and a webcam
- a reliable internet connection

## 5. Methods of Evaluation

There will be two cumulative multiple-choice tests.

The final exam will be a two-hour cumulative multiple-choice examination. It will be scheduled by the Registrar Office during the examination period (December 10–22).

The overall course grade will be calculated as listed below:

Test 1	20%
Test 2	30%
Final Exam	50%

All the assessments (tests 1-2 and the final exam) are closed book. Non-programmable hand-held calculators are allowed.

### Accommodated Evaluations

- There will be no make-ups for tests 1 and 2. If you miss a test due to a legitimate reason (to be determined by counsellors), the percentage of the assessment (a test or the final exam) that you will write next will become the percentage of the missed test. For example, if you miss test 1 but write test 2, the percentage of test 2 will also be the percentage of test 1. If you miss tests 1 and 2, the percentage of the final exam will become the percentages of tests 1 and 2.
- If you miss the final exam due to a legitimate reason (to be determined by counsellors), you will have a chance to write a make-up final exam some time in 2023. See **Absences from Final Examinations** below.

### Rounding of Marks Statement

Across the Sciences Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. **Final grades** on this course, irrespective of the number of decimal places used in marking individual

assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. Marks WILL NOT be bumped to the next grade or GPA, e.g. a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark “bumping” will be denied.

## 6. Student Absences

### **Academic Consideration for Student Absences**

Students who experience an extenuating circumstance (illness, injury or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible.

For further information, please consult the University’s medical illness policy at

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf)

The Student Medical Certificate is available at

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf)

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons.

### **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>.

### **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).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

## 7. Accommodation and Accessibility

### Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD), 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](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](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 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 the following Web site:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

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.

**In the event of health lock-down, remote proctoring software may be used in this course.** By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at:

<https://remoteproctoring.uwo.ca>.

## 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/>.

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 (519) 661-2147 if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.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.

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

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