

SS2141: Applied Probability and Statistics for Engineers

Course Outline

1. Course Information

Section 001/003 (Instructor: Dr. Katsu Goda)

Lectures: Monday, Wednesday, Friday 1:30 to 2:30 pm (Location: WSC-55)
 Tutorial: Wednesday 5:30 to 6:30 pm (Location: NSC-1)

Section 002/004 (Instructor: Dr. Ricardas Zitikis)

Lectures: Tuesday 5:30 to 6:30 pm (Location: MC-110), Wednesday 6:30 to 7:30 pm (Location: NSC-1), Friday 12:30 to 1:30 pm (Location: MC-110)
 Tutorial: Tuesday 11:30 am to 12:30 pm (Location: AHB-1R40)

Prerequisites

0.5 course from Numerical and Mathematical Methods 1412A/B, Calculus 1000A/B, Calculus 1500A/B, the former Applied Mathematics 1412A/B, plus 0.5 course from Numerical and Mathematical Methods 1414A/B, Calculus 1301A/B, Calculus 1501A/B, the former Applied Mathematics 1414A/B. The former Applied Mathematics 1413 may also be used to meet this 1.0 course prerequisite.

Antirequisites

This course cannot be taken for credit in any module in Data Science, Statistics, Actuarial Science, or Financial Modelling, other than the Minor in Applied Statistics or the Minor in Applied Financial Modeling. All other courses in Introductory Statistics (except Statistical Sciences 1023A/B, Data Science 1000A/B or the former Statistical Sciences 1024A/B): Biology 2244A/B, Economics 2122A/B, Economics 2222A/B, Geography 2210A/B, Health Sciences 3801A/B, MOS 2242A/B, Psychology 2811A/B or the former Psychology 2810, Psychology 2801F/G or the former Psychology 2820E, Psychology 2830A/B, Psychology 2850A/B, Psychology 2851A/B, Social Work 2207A/B, Sociology 2205A/B, Statistical Sciences 2035, Statistical Sciences 2143A/B, Statistical Sciences 2244A/B, Statistical Sciences 2858A/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

Sections	Instructors	Email	Office	Phone	Office Hours
001/003	Dr. Katsu Goda	kgoda2@uwo.ca	BGS 1076	Ext. 83189	By appointment
002/004	Dr. Ricardas Zitikis	rzitikis@uwo.ca	WSC 231	Ext. 86983	By appointment

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

3. Course Syllabus, Schedule, Delivery Mode

An introduction to statistics with emphasis on the applied probability models used in Electrical and Civil Engineering and elsewhere. Topics covered include samples, probability, probability distributions, estimation (including comparison of means), correlation and regression.

Learning outcomes

Upon successful completion of this course, students will become 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
Reading Week: October 31 to November 6, 2022
Classes end: December 8, 2022
Delivery mode: In-person

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 and recommended online learning platform

Introduction to the Practice of Statistics by David S. Moore; George P. McCabe; Bruce Craig
<https://www.macmillanlearning.com/college/ca/product/Introduction-to-the-Practice-of-Statistics/p/1319244440>.

Recommended *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>

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

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.

5. Methods of Evaluation

There will be **two cumulative multiple-choice tests (Tests 1 and 2)**, each worth **20%**.

The test 1 is scheduled on **Friday, October 14th, 2022, 20:00 to 21:00 pm**.

The test 2 is scheduled on **Friday, November 11th, 2022, 20:00 to 21:00 pm**.

The **final exam**, which is worth **60%**, will be a **three-hour cumulative multiple-choice examination**. It will be scheduled by the Registrar Office during the examination period (December 10th to 22nd, 2022).

The overall course grade will be calculated as listed below:

Tests 1 and 2: 20 + 20 = 40%

Final Exam: 60%

All the assessments (Tests 1 and 2, and the Final Exam) will be **closed book**. Non-programmable hand-held calculators will be allowed.

Course schedule (this may change, depending on the progress of the lectures)

Week	Topics
Week 1 (Sept. 5 -)	Briefing
Week 2 (Sept. 12 -)	Chapter 1 (Looking at Data – Distributions)
Week 3 (Sept. 19 -)	Chapter 2 (Looking at Data – Relationships)
Week 4 (Sept. 26 -)	Chapter 3 (Producing Data)
Week 5 (Oct. 3 -)	Chapter 4 (Probability: The Study of Randomness)
Week 6 (Oct. 10 -)	Chapter 5 (Sampling Distributions); Test 1 (October 14th)
Week 7 (Oct. 17 -)	Chapter 6 (Introduction to Inference)
Week 8 (Oct. 24 -)	Chapter 7 (Inference for Distributions)
Fall reading week (October 31 st to November 6 th , 2022)	
Week 9 (Nov. 7 -)	Chapter 8 (Inference for Proportions); Test 2 (November 11th)
Week 10 (Nov. 14 -)	Chapter 9 (Inference for Categorical Data) & Chapter 10 (Inference for Regression)
Week 11 (Nov. 21 -)	Chapter 10 (Inference for Regression) & Chapter 11 (Multiple Regression)
Week 12 (Nov. 28 -)	Chapter 12 (One-Way Analysis of Variance)
Week 13 (Dec. 5 -)	Chapter 13 (Two-Way Analysis of Variance)
Final Exam (December 10 th to 22 nd , 2022)	

Accommodated evaluations

There will be **no make-ups** for Tests 1 and 2. If you miss any of the two tests due to a legitimate reason (to be determined by counsellors), the following will apply:

- In the case of one missed test, 20% will be appended to the final exam, thus making it worth $20 + 60 = 80\%$.
- In the case of two missed tests, $20 + 20 = 40\%$ will be appended to the final exam, thus making it worth $20 + 20 + 60 = 100\%$.
- 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 2022. 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

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

For work totalling 10% or more of the final course grade (i.e., Tests and Final Exam), you 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.

The Student Medical Certificate is available at

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

As stated in Section 5 above, there will be **no make-ups** for missed Tests 1 and 2.

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](#)).

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.

6. 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.

7. 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.

Non-programmable hand-held calculators will 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.

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, tests and examinations in this course will be conducted using a remote proctoring service. 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>.

8. 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/>.