

Department of Statistical and Actuarial Sciences

Introduction to Statistics

Statistical Sciences 1024B

*Section 001*

Winter 2021

Course Outline

Technical Requirements and Important Dates:



Stable internet connection



Laptop or computer



Working microphone



Working webcam



Classes Start	Reading Week	Classes End	Study day	Exam Period
January 11	February 15 - 19	April 12	April 13	April 14 - 30

\* March 15, 2021: Last day to drop a second-term half course or a second-term full course without penalty



Although this academic year might be different, Western University is committed to a **thriving campus**. We encourage you to check out the [Digital Student Experience](#) website to manage your academics and well-being. Additionally, the following link provides available resources to support students on and off campus: <https://www.uwo.ca/health/>.

## 1. Course Information

*Official Schedule:* Tuesdays, 8:30-9:30 AM and Thursdays, 8:30-10:30 AM

### Course information

*Introduction to Statistics*

Statistical Science 1024B – Section 001 – Winter 2021

### List of Prerequisite(s)

Grade 12U Mathematics or Mathematics 0110A/B or Mathematics 1229A/B

### List of Antirequisite(s)

All other courses or half courses in Introductory Statistics, except Statistical Sciences 1023A/B and Statistical Sciences 2037A/B. For a full list of Introductory Statistics courses, see <https://www.westerncalendar.uwo.ca/Departments.cfm?DepartmentID=55>. You cannot take a listed anti-requisite course concurrently with Statistical Sciences 1024A/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	Contact Information
Ruixi Zhang, <i>Ph.D.</i> Section 001	rzhan56@uwo.ca



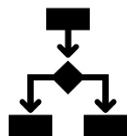
Course Coordinator	Contact Information
Serge Provost, <i>Ph.D., A.S.A.</i>	provost@stats.uwo.ca

**Office hours and tutorials:** via email and/or Zoom by the instructor and a team of teaching assistants at times to be announced on OWL. The instructor will be available at the end of the synchronous lectures.

As well, solved problems will be posted on the course websites.

Students must use their Western (@uwo.ca) email addresses when contacting their instructors and indicate the course number (SS1024) in the subject line.

### 3. Course Syllabus and Delivery Mode



Type	Mode	Schedule	Frequency
Lectures	Online	Tuesday 8:30-9:30 AM	Weekly
Lectures	Online	Thursday 8:30-10:30 AM	Weekly

All lectures will be delivered synchronously at times that will be specified on OWL.

#### Learning Outcomes



Upon successful completion of this course, students will have a basic understanding of

- The techniques utilized in exploring, organizing, describing and analyzing data
- The collection of data through surveys and experiments
- Probabilistic principles
- Statistical inference: including confidence interval construction and tests of hypotheses

The following table refers to the customized loose-leaf version of *The Basic Practice of Statistics* by Moore, Notz and Fligner (8<sup>th</sup> Edition)

### Table of Contents and Approximate Schedule

Week	Overview	Topics
1 - 2	<b>Dates:</b> January 11 – 22 <b>Ch 1:</b> Picturing Distributions with Graphs  <b>Ch 2:</b> Describing Distributions with Numbers	Course Introduction <b>Sections 1.1-1.4, 1.6 (excluding stem-plots):</b> Individuals, variable, pie charts, bar graphs, histograms, interpretation, time plots  <b>Sections 2.1-2.8:</b> Measuring center, mean, median, quartiles, 5-number summary, boxplots, outliers, standard deviation
3	<b>Dates:</b> January 25 – 29 <b>Ch 3:</b> The Normal Distributions	<b>Sections 3.1-3.8:</b> Density curves, normal distributions, 68-95-99.7 rule, standard normal distribution, normal proportions, normal table
4	<b>Dates:</b> February 1 – 5 <b>Ch 4:</b> Scatterplots and Correlation  <b>Ch 5:</b> Regression	<b>Sections 4.1-4.6:</b> Explanatory & response variables, scatterplots, correlation  <b>Sections 5.1-5.2, 5.4-5.8:</b> Regression lines, least-squares regression line, residuals, influential observations, cautions
5	<b>Dates:</b> February 8 – 12 <b>Ch 6:</b> Two-Way Tables	<b>Sections 6.1-6.3:</b> Marginal & conditional distributions, Simpson's paradox
Chapter 7 is a review chapter		
6	<b>Dates:</b> February 22 – 26 <b>Ch 8:</b> Producing Data: Sampling	<b>Sections 8.1-8.7 (exclude Table B):</b> Population, sample, simple random sample (SRS), inference, other sampling designs
7	<b>Dates:</b> March 1 – March 5 <b>Ch 9:</b> Producing Data: Experiments  <b>Ch 10:</b> Data Ethics (Reading material)	<b>Sections 9.1-9.7:</b> Observation versus experiment, subjects, factors, treatments, experimental designs  <b>Sections 10.1-10.5:</b> Institutional review boards, informed consent, confidentiality, clinical trials



Chapter 11 is a review chapter		
8	<p><b>Dates:</b> March 8 – March 12</p> <p><b>Ch 12:</b> Introducing Probability</p> <p><b>Ch 13:</b> General Rules of Probability</p> <p><b>Ch 14:</b> Sampling Distributions</p>	<p><b>Sections 12.1-12.8:</b> Randomness, probability models, probability rules, finite, continuous, random variables, personal probability</p> <p><b>Sections 13.1-13.5:</b> Addition rule, independence, multiplicative rule, conditional probability</p> <p><b>Sections 14.1-14.6:</b> Parameters, statistics, law of large numbers, sampling distributions, central limit theorem, statistical significance</p>
9	<p><b>Dates:</b> March 15 – March 19</p> <p><b>Ch 15:</b> Confidence Intervals</p>	<p><b>Sections 15.1-15.4:</b> Statistical estimation, margin of error, confidence intervals for a population mean</p>
10	<p><b>Dates:</b> March 22 – March 26</p> <p><b>Ch 16:</b> Tests of Significance</p> <p><b>Ch 17:</b> Inference in Practice</p>	<p><b>Sections 16.1-16.5:</b> Hypotheses, P-values, tests for a population mean</p> <p><b>Sections 17.1-17.5:</b> Conditions, cautions, sample size for confidence intervals, power of a statistical test (definition only)</p>
Chapter 18 is a review chapter		
11	<p><b>Dates:</b> March 29 – April 2</p> <p><b>Ch 19:</b> Inference about a Population Mean</p>	<p><b>Sections 19.1-19.4, 19.6:</b> t-distribution, one-sample t confidence interval, one-sample t test, matched pairs</p>
12 - 13	<p><b>Dates:</b> April 5 – April 12</p> <p><b>Ch 20:</b> Comparing Two Means</p>	<p><b>Sections 20.1-20.3, 20.5-20.8:</b> Two-sample problems, two-sample confidence intervals and hypothesis tests, robustness</p>

## 4. Course Materials

A customized loose-leaf textbook is required: *The Basic Practice of Statistics* by Moore, Notz and Fligner. The customized textbook includes a subscription to Sapling. Sapling Learning is an online learning system that can be used as an extra resource as you take this course. This supplement includes resources (i.e., supplementary videos, online applets, tutorials and extra practice problems) that will be particularly useful for any concepts you find challenging. The customized version is available online from the UWO Bookstore. The posted materials will refer to the customized version.

Note that this customized version is based on the 8<sup>th</sup> Edition of the textbook of the same name. (An electronic copy is available at the BookStore.) Therefore, if you are unable to obtain a copy of the customized book, the standard 8<sup>th</sup> Edition will suffice (but may be more expensive). However, note that our listed chapter indices are with respect to the customized textbook. Chapters 14-21 in the customized textbook correspond to Chapters 15-22 in the standard 8<sup>th</sup> Edition.

**Students should check OWL (<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. Students are responsible for connecting daily to the course website.

All relevant course material including online lectures, suggested exercises, solutions and additional notes will be posted to OWL: <http://owl.uwo.ca>. Any changes will be indicated on the OWL site and discussed with the class.



If students need assistance, 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.

[Google Chrome](#) or [Mozilla Firefox](#) are the preferred browsers to optimally use OWL; update your browsers frequently. Students interested in evaluating their internet speed, please click [here](#).

***Students are expected to complete the Proctortrack onboarding test prior to Reading Week. This provides an opportunity to install and test the Proctortrack software before entering a higher-stakes exam environment.***

*If students need assistance, they can seek support on the [OWL Help page](#). Alternatively, they can contact the [Western Technology Services Helpdesk](#). They can be reached by phone at 519-661-3800 or ext. 83800.*

*[Google Chrome](#) or [Mozilla Firefox](#) are the preferred browsers to optimally use OWL; update your browsers frequently. Students interested in evaluating their internet speed, please click [here](#).*

## 5. Methods of Evaluation

The overall course grade will be calculated as follows:

- \* *Four assignments worth in total 20%* (the best three out of four will be counted)
- \* *A two-hour midterm exam worth 30%* to be scheduled by the registrar
- \* *A three-hour final exam worth 50%* to be scheduled by the registrar.

One (two-sided) crib sheet will be allowed for the midterm exam and two (two-sided) crib sheets will be permitted for the final exam. The topics covered in these exams will be posted on the course website.

*In the event that someone legitimately misses the midterm exam and provides the required supporting documentation, the weight of that exam will be added to the final exam's. Note that no make-up exam is planned for the midterm exam. Similarly, for the assignments: if more than one is missed legitimately, their weights will be transferred to the other assignments.*

Click [here](https://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#SubHeading_73) ([https://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#SubHeading\\_73](https://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#SubHeading_73)) for a detailed and comprehensive set of policies and regulations concerning examinations and grading.

## 6. 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 Academic Accommodation for Students with Disabilities policy 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)

### **Academic Consideration for Student Absence**

Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the semester, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are

expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are not allowed to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student's final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

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. All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.

For policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs, see:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic\\_Consideration\\_for\\_absences.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf)

and for the Student Medical Certificate (SMC), see:

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

## **Religious Accommodation**

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar:

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

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](http://www.registrar.uwo.ca/examinations/exam_schedule.html)).

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](http://www.registrar.uwo.ca/examinations/exam_schedule.html)).

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 Academic Calendar for details (under [Special Examinations](#)).



## 7. Academic Policies

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

Non-programmable calculators are permitted during the exams; note that mobile phones and other electronic communication devices are strictly prohibited.

**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).

The remote learning sessions for this course will be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings. Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Tests in this course may be conducted using Zoom in which case you will be required to keep your camera on for the entire session, hold up your student card for identification purposes, and share your screen with the invigilator if asked to do so at any time during the exam. The exam session will not be recorded.

More information about the use of Zoom for exam invigilation is available in the Online Proctoring Guidelines at the following link:

<https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf>

The remote proctoring service, Proctortrack or other monitoring softwares may also be used. Proctortrack will require you to provide personal information (including some biometric data). The session will be recorded. By taking this course, you are consenting to the use of this software.

Completion of this course will require you to have a reliable internet connection and a device that meets the system requirements for Zoom. Information about the system requirements are available at the following link:

<https://support.zoom.us/hc/en-us>

Please note that Zoom servers are located outside Canada. If you would prefer to use only your first name or a nickname to login to Zoom, please provide this information to the instructor in advance of the test or examination.

More information about remote proctoring is available in the Online Proctoring Guidelines at the following link: <https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf>

## Professionalism & Privacy

Western students are expected to follow the [Student Code of Conduct](#). Additionally, the following expectations and professional conduct apply to this course:



- Students are expected to follow online etiquette expectations provided on OWL
- All course materials created by the instructor(s) are copyrighted and cannot be sold/shared
- Recordings are not permitted (audio or video) without explicit permission
- Permitted recordings are not to be distributed
- Students will be expected to take an academic integrity pledge before some assessments

## Copyright Statement

Please be aware that all course materials created by the instructor(s) are copyrighted and **cannot be sold/shared**. Those include materials used in tests/quizzes, midterms, and finals. Any posting/sharing of such materials in part or whole without owner's consent is considered as violation of the Copyright Act and will be considered as a scholastic offence.

In addition, online services such as Chegg are actively monitored. Any questions that are coming out during midterms and finals and are posted to an online service will be searched. Such an activity will be considered as a scholastic offence and will result in academic penalty.

## 8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on add/drop 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 Student Accessibility Services (SAS) at (519) 661-2147 if you have any questions regarding accommodations.

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

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