



SS 2858A Course Outline

1. Course Information

Course Information

Course Number: Statistical Sciences 2858A

Course Name: Probability and Statistics II

Academic Term: Summer 2026

Location: Distance Studies/ Online

Time: Asynchronous

List of Antirequisites

All other courses in Introductory Statistics (except [Statistical Sciences 1023A/B](#) and [Data Science 1000A/B](#) or the former [Statistical Sciences 1024A/B](#)): [Biology 2244A/B](#), [Economics 2122A/B](#), [Economics 2222A/B](#), [Geography and Environment 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 2141A/B](#), [Statistical Sciences 2143A/B](#), [Statistical Sciences 2244A/B](#).

List of Prerequisites

A minimum mark of 60% in [Statistical Sciences 2857A/B](#).

Unless you have either the prerequisites for this course or written special permission from the Department of Statistical and Actuarial Sciences to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record. This decision may not be appealed.

2. Instructor Information

Office hours will be held on zoom.

Instructors	Email	Office Hours
Dr. Holly Steeves	Holly.steeves@uwo.ca	T 12:00 – 1:30 Th 12:00 – 1:30
(TA) Zehui Wu	Zwu726@uwo.ca	M 10:00 – 11:00 F 1:00 – 2:00

Communication

Piazza

We will be using Piazza (for the first time, so bare with me) for communication. This should be your FIRST STOP for ANY questions pertaining to the course or content. There will be folders where you can post questions to be answered by fellow students, or by the TA or professor. You will be able to search to see if someone has already asked the question, post your own questions (anonymously or with your name) or you can send private messages to your TA or professor. This method is preferred over emailing. Please use the rules below for emailing or private messages.

Rules for Emailing

- Students **must** use their Western (@uwo.ca) email addresses when contacting their instructor or TA.
- You must put “SS2858” in the subject line of the email.
- DO NOT send follow up emails. Allow at least 2 entire business days (not holidays or weekends) for a response.
- Before emailing, look for the information you are inquiring about in the syllabus, announcements, or documents found on Brightspace, or on Piazza. Use the checklist below BEFORE sending an email.

Checklist for Emailing (or private messages on Piazza)

1. Is the question I am asking in the course syllabus, on the course website, or been emailed to me? (No? Continue to question 2)
2. Is there a discussion post on Piazza about my question? (No? Continue to question 3)
3. Is it a question about content, or assignment questions, etc? (Yes? Attend office hours and/or make a post on Piazza.) (No? Continue to question 4)
4. If it is a personal matter (grades, etc), NOW you may email or private message your professor.

If the email rules have not been followed, or if you have not followed the appropriate steps for finding the information needed, you may not receive a response or may receive an automated response.

3. Course Syllabus, Schedule, Delivery Mode

Course Description

An introduction to the theory of statistics with strong links to data as well as its probabilistic underpinnings. Topics covered include estimation and hypothesis testing, sampling distributions, linear regression, experimental design, law of large numbers and central limit theorem.

Course Level Learning Objectives

By the end of this course, students will be able to:

- Obtain point estimators for population parameters.
- Calculate and interpret confidence intervals for a population parameter using theory.
- Perform a hypothesis test for a population parameter, interpret the types of errors that could be made, and calculate the power of the test.
- Perform hypothesis tests and confidence intervals about two population parameters, interpret, and calculate the power from theory.
- Perform simple linear regression and perform any tests or confidence intervals about the parameters of the regression model and interpret.

Course Delivery

The course will be taught asynchronously as the class voted 93% in favour of this delivery method. That means recordings of the lecture content will be posted to the course website that you can watch at your own leisure. HOWEVER, tutorials will still be LIVE! There will be quizzes held within the tutorials, and therefore you must be present.

Tutorial Schedule

Tutorial 1	July 10	9:00 – 11:00 AM
Tutorial 2	July 17	9:00 – 11:00 AM
Tutorial 3	July 28	9:00 – 11:00 AM
Tutorial 4	August 5	9:00 – 11:00 AM
Tutorial 5	August 13	9:00 – 11:00 AM

Course Content and Tentative Schedule

Chapter	Topics
7.1	Point estimates and estimators, mean squared error, bias and standard error, including calculations, meanings, and properties.
7.2	Methods of estimation including Method of Moments and Maximum Likelihood Estimation and some of their properties.
8.1	Confidence intervals (CIs) in general, confidence level, precision, and sample size.
8.2	Large sample confidence intervals for a population mean and population proportion. One-sided CIs.
8.3	T-distribution, CIs based on Normal population distributions and prediction intervals (PIs).
8.4	CIs for population variance and standard deviation and the chi-square distribution (χ^2).
9.1	Hypothesis testing in general, including null and alternate hypotheses, test procedure, rejection region, errors, significance level, interpretation and conclusions.
9.2	Tests about a population mean, power and sample size determination.
9.3	Tests about a population proportion.

9.4	p-value.
9.5	Hypothesis test selection.
10.1	CIs and hypothesis tests on the difference between two population means.
10.2	CIs and hypothesis tests on the difference between two population means using the t-distribution.
10.3	CIs and hypothesis tests for matched pairs.
10.4	CIs and hypothesis tests for the difference in population proportions.
10.5	CIs and hypothesis tests for the ratio in population variances, F distribution.
12.1	Simple linear regression.
12.2	Least squares regression, estimating model parameters, estimating σ , fitted values, residuals, error sum of squares, coefficient of determination.
12.3	Inferences about the regression coefficient including CIs and hypothesis tests and regression ANOVA.
12.4	Inferences about mean response and prediction of future values
12.5	Sample correlation coefficient, its properties, the population correlation coefficient and inferences about correlation.
12.6	Assessing model fit, residuals and standardized residuals, diagnostic plots, difficulties and remedies.

4. Course Materials

Textbook and Other Learning Materials

- **Required textbook:** [Devore, Jay L. *Modern Mathematical Statistics with Applications*. 3rd ed. 2021., Springer International Publishing, 2021, <https://doi.org/10.1007/978-3-030-55156-8>.]. **The textbook costs** [Free from the Western Library].
- Students are welcome to use second-hand or earlier editions of this textbook (which can be found online for free as well), however, please note that the questions assigned are from the 3rd edition and will therefore not be correct for previous editions.

All course material will be posted to OWL: <https://westernu.brightspace.com/>

Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) regularly 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 Brightspace 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

Physical items: webcam, microphone, keyboard, mouse, highspeed internet connection.
Operating system: Mac: macOS 12 Monterey or higher, PC: Windows 10 or higher,
Chromebook: Version 100 or higher
Processor/RAM: MAC: Intel/Apple Silicon Processor 8 GB RAM, PC: Dual-core 2.4 Ghz
CPU, 8 GB RAM or better
Web Browser: Mozilla Firefox v100.0 or higher, Google Chrome v100.0 or higher
Plugins: Javascript enabled & Third Party Cookies enabled
Camera: 800 X 600 resolution or better
Internet Connection: Cable Modem DSL or higher (1.5 Mbps download & 1.5 Mbps upload)
Mobile Requirements: Android: 10 and above, iOS: 12 and above

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

Assignments (5)	20%
Syllabus Quiz	1%
Proctortrack Setup	1%
Quizzes (5)	3%
Midterm Test	30%
Final Exam	45%

Assessment Dates

Assessment	Date	Content
Assignment 1	Due: Tues, Jul 14, 11:55 PM	Chapter 7
Assignment 2	Due: Wed, Jul 21, 11:55 PM	Chapter 8
Assignment 3	Due: Thurs, Jul 30, 11:55 PM	Chapter 9
Assignment 4	Due: Thurs, Aug 6, 11:55 PM	Chapter 10
Assignment 5	Due: Fri, Aug 14, 11:55 PM	Chapter 12
Syllabus Quiz	Due: Fri, July 17, 11:55 PM	Syllabus
Proctortrack Onboarding	Due: Fri, July 24, 11:55 PM	
Midterm	Wed, July 29, 1:00 PM – 3:00 PM	Chapters 7 - 9
Final Exam	Mon, Aug 17, 9:00 AM – 12:00 PM	All Chapters

Assignments

- There are 5 assignments in the course worth a total of 20%. These will be weighted based on the size of the assignment (meaning not every assignment holds the same weight). Each assignment is due at 11:55PM on the evening of the due date. There is a 48 hour No-Late-Penalty Period, meaning you can submit your assignment late, up to 2 days after the deadline, without any penalty. Should students submit their assessment beyond 48 hours past the deadline, a late penalty of 50% per day will be applied. Submissions are not accepted later than 72 hours after the deadline and a grade of 0 will be earned.

- Assignments will be available on the course Brightspace page and the Gradescope page (<http://www.gradescope.ca/>). Solutions **must** be submitted to **Gradescope**. It is your responsibility to make sure that your assignment is successfully uploaded and legible. Submissions that cannot be read by the grader will receive a grade of zero. Assignment questions **must be properly assigned to each page** or the submission will not be graded. To do so, submit a **single pdf** that contains your entire assignment. It will then ask you to click which page(s) contains which question(s). You do not have to have each question on separate pages to achieve this. Practice with the practice assignment beforehand so that no marks are lost. Step by step instructions are on the course website to follow.
- After receiving the grades from an assignment, **students will have 72 hours to submit any regrade requests on that assignment with the possible exception of the final assignment, depending on the marking timeline**. After this three-day period, regrade requests will NOT be accepted and the assignment grade will be finalized. Regrade requests **must** be made using the Gradescope tool “Regrade Request”.
- Solutions to assignments **will not** be posted; however, TAs will provide comments on incorrect answers using Gradescope which will allow students to determine the correct solutions. In addition, students can ask the instructor or TA for more details on solutions via the Regrade Request tool on Gradescope, in the discussion boards on Brightspace, and during office hours.

Syllabus Quiz

This quiz will be done on Brightspace any time during the first two weeks of classes. It will be due Friday, July 17th at 11:55PM. This quiz contains questions on information in the syllabus (yes, THIS document), to ensure that you have read this crucial document. This quiz is an all or nothing point, and has unlimited question attempts until you get the correct answer. Note: **all questions must be correct before submitting or you will not receive the percentage point**. As you have unlimited question attempts, it is **your responsibility** to ensure that all questions are correct before pressing submit.

Proctortrack Setup

To ensure that things run smoothly for the midterm and final while using proctortrack, you are required to complete a Proctortrack onboarding. This takes almost no time at all and is there so that you can familiarize yourself with the exam process. It will also perform a system check to prepare the device that you will be using. Make sure you use the **same device** that you will use during your exams for the onboarding so that it sets it up on the correct device. For completing this process, you will get 1% towards your final grade. This is an all or nothing percentage point. You have until July 24th at 11:55PM to complete this process and earn the point.

Note: you must **successfully** complete the onboarding. Onboarding can sometimes fail for various reasons (which will be told to you upon failure). Therefore, make sure you allow enough time to try again in case you fail the first time or two. **DO NOT** wait until the due date to try it for the first time.

Quizzes

Quizzes will be held during the tutorial times. They will be short, timed, multiple choice or short answer submissions based on topics covered during the tutorial. You will be graded on your top 4 quizzes (lowest single quiz grade gets dropped). **This is to account for any absences for any reason. No excuses will be given for missing more than one quiz.**

Midterm and Final Exam

The Midterm will be **July 29th, 1:00PM – 3:00PM** and the Final Exam will be **August 17, 9:00AM – 12:00PM**. Note, these times are NOT DURING CLASS TIME. Make sure you make the proper accommodations to your schedule ASAP so that you are available during these times. Both the Midterm and Final Exam will be online and closed book. However, for the Midterm, you are allowed a single, letter-sized (8.5" x 11"), one-sided, HANDWRITTEN (old-school pen to paper) cheat sheet and a non-programmable calculator. For the Final Exam, you are allowed a single, letter-sized (8.5" x 11"), double-sided, HANDWRITTEN (old-school pen to paper) cheat sheet and a non-programmable calculator. Nothing printed from a computer or tablet will be allowed at either exam. Both will be proctored via Proctortrack. Please see Proctortrack section for more information. The Midterm will tentatively cover chapters 7, 8, and 9. This is subject to change depending on how much material we get through. The Final Exam will cover all chapters.

Use of Generative AI Tools

Any and all AI tools are **prohibited** for use towards any assignment, quiz, midterm or exam in this course. This includes for brainstorming, ideas, or solutions. If you are caught using AI towards these assessments in any way, this will be considered a serious academic offense and will be handled accordingly.

AI can however be a great studying tool. Feel free to use it to generate practice questions to help study for tests etc. **DO NOT SUBMIT ANY OF MY CONTENT INTO AI.** These materials are my intellectual property and I do not give permission for use of these materials apart from studying in this course. This includes, but is not limited to, my lecture slides, my notes, my assignments, my tests, etc. All this content is made by me, and I do not approve the submission into any generative AI tool.

General information about missed coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs*, posted on the Academic Calendar: https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage: https://registrar.uwo.ca/academics/academic_considerations/

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this and, therefore, always require formal supporting documentation:

- Examinations scheduled during official examination periods (Defined by policy)
- Midterm (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)

When a student mistakenly submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

Evaluation Scheme for Missed Assessments

Syllabus Quiz and Proctortrack

If a student misses the deadline for either the syllabus quiz or Proctortrack and submits for an academic consideration, a 2-day extension will be granted. After this 48-hour period, no submissions will be accepted any further.

Assignments

There is a 2-day (48 hour) No-Late-Penalty period after the due date, therefore no further extensions will be granted, with or without academic considerations. Assignments will not be accepted more than 3 days after the due date to ensure timely marking and feedback on solutions to the students. Extenuating circumstances will be handled on a case-by-case basis.

Midterm and Final

The midterm is the designated assignment where you must provide supporting documentation for an absence. If an academic consideration is approved for missing the midterm, the weight will be shifted onto the final (that covers the same material, since the exam is cumulative). Final Exams always require supporting documentation for an absence. Please see the university policy on missing Final Exams.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under [Special Examinations](#)), especially for those who miss multiple final exams within one examination period.

Essential Learning Requirements

Even when Academic Considerations are granted for missed coursework, the following are deemed essential to earn a passing grade.

- a minimum grade of 40% on the final to ensure that students demonstrate sufficient mastery of the learning outcomes.

In such cases, the consequence of not meeting the requirement is failing the course with the final grade you earned, or a 40, whichever is **lower**.

Coursework with Assessment Flexibility

By policy, instructors may deny Academic Consideration requests for the following assessments with built-in flexibility:

Flexible Completion

Quizzes. This course has 5 quizzes, and the 4 quizzes with the highest marks are counted towards your final grade. Should extenuating circumstances arise, students do not need to request Academic Consideration for the first missed quiz. Academic consideration requests will be denied for missing quizzes.

Deadline with a No-Late-Penalty Period

Assignments. Students are expected to submit each of the assignments by the deadline listed. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their assignment up to 48 hours past the deadline without a late penalty. Should students submit their assessment beyond 48 hours past the deadline, a late penalty of 50% per day will be applied. Submissions are not accepted later than 72 hours after the deadline and a grade of 0 will be earned. Academic Consideration requests may be denied. Extenuating circumstances will be handled on a case-by-case basis.

6. Additional Statements

6.1 Religious Accommodation

When a recognized religious holiday or observance conflicts with an examination, test, or other scheduled academic obligation, students must request accommodation via the University's Student Absence Portal (SAP). This request should identify the conflict and specify which course component(s) (e.g. test, midterm, exam) are affected.

Students are encouraged to submit the SAP request as early as possible, but no later than two weeks before any examination, or one week before any mid-term test or quiz, to allow sufficient time for adjustment.

The SAP request serves as official notification to both the course instructor and the Academic Advising Office, in accordance with University

policy: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

The Faculty of Science considers religious accommodations as scheduling conflicts. Instructors should provide either a make-up exam or an earlier sitting of the same exam to accommodate the student.

For more information on recognized religious holidays, please visit the Diversity Calendar posted on the Equity, Diversity & Inclusion website - <https://www.edi.uwo.ca>

6.2 Academic 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.

6.3 General Academic Policies

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

Use of @uwo.ca email: 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 email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as “appeals”)

Policy on Request for Relief from Academic Decision:

https://uwo.ca/univsec/pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic

Offences: https://uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):

https://uwo.ca/univsec/pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at your desk, on your person, or within reach during an assessment will be treated as a *scholastic offence*, even if the device is not in use.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

Remote Proctoring

Tests and examinations in this course will be conducted using a remote proctoring service (Proctortrack). 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>.

6.5 Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, 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 (GBSV) and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced GBSV (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. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at http://academicsupport.uwo.ca/accessible_education/index.html

Learning-skills counsellors at Learning Development and Success (<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.

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