Western Science

Department of Biology *and*
Department of Statistical & Actuarial Sciences

Biology/Statistics 2244A – "Statistics for Science"

Course syllabus/outline for Fall 2024 (term 1249)

THRIVE together

Western University is committed to a **thriving campus**. We encourage you to check out the Your 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/. Students who are in emotional/mental distress should refer to Mental Health@Western (http://uwo.ca/health/) for a complete list of options about how to obtain help.

Course Information

Biology 2244A and Statistics 2244A, sections 200 & 201, FW24

An introductory course in the application of statistical methods, intended for students in departments other than Statistical and Actuarial Sciences, Applied Mathematics, Mathematics, or students in the Faculty of Engineering. Topics include sampling, confidence intervals, analysis of variance, regression and correlation.

List of Prerequisite(s)

1.0 mathematics course, or equivalent numbered 1000 or above. Data Science 1000A/B or the former Statistical Sciences 1024A/B or Integrated Science 1001X can be used to meet 0.5 of the 1.0 mathematics course requirement.

List of Antirequisite(s)

All other courses in Introductory Statistics (except Statistical Sciences 1023A/B, Data Science 1000A/B, or the former Statistical Sciences 1024A/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 2141A/B, Statistical Sciences 2143A/B, Statistical Sciences 2858A/B.

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Advisors) 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.

Land Acknowledgement

Some of my core teaching practices and values stem from opportunities I have had to learn from, and work alongside, diverse Indigenous peoples. Currently, I am reflecting on the nature of knowledge, and how students of statistics would benefit from *Etuaptmumk*[1]. Given the influence that Indigenous peoples have on my teaching, I want to acknowledge that Western University is located on the traditional lands of the Anishinaabek, Haudenosaunee, Lūnaapéewak, and Chonnonton Nations, on lands connected with the London Township and Sombra Treaties of 1796 and the Dish with One Spoon Covenant Wampum. This land continues to be home to diverse Indigenous peoples (First Nations, Métis and Inuit) whom I recognize as contemporary stewards of the land and vital contributors to our society.

[1] Etuaptmumk is a Mi'kmaw word meaning "Two-eyed Seeing", a concept developed by Mi'kmaq Elder Albert Marshall; https://www.2eyedseeing.ca/about-5

Important Dates

- **Classes start:** Sept 5
- **Add Deadline:** Sept 13
- **Fall Reading Week:** Oct 12–20
- **Drop Deadline:** Dec 2
- **Classes end:** Dec 6
- **Exam period:** Dec 9–22

Instructor Information

Course Instructor

Jennifer Peter (she/her/hers)

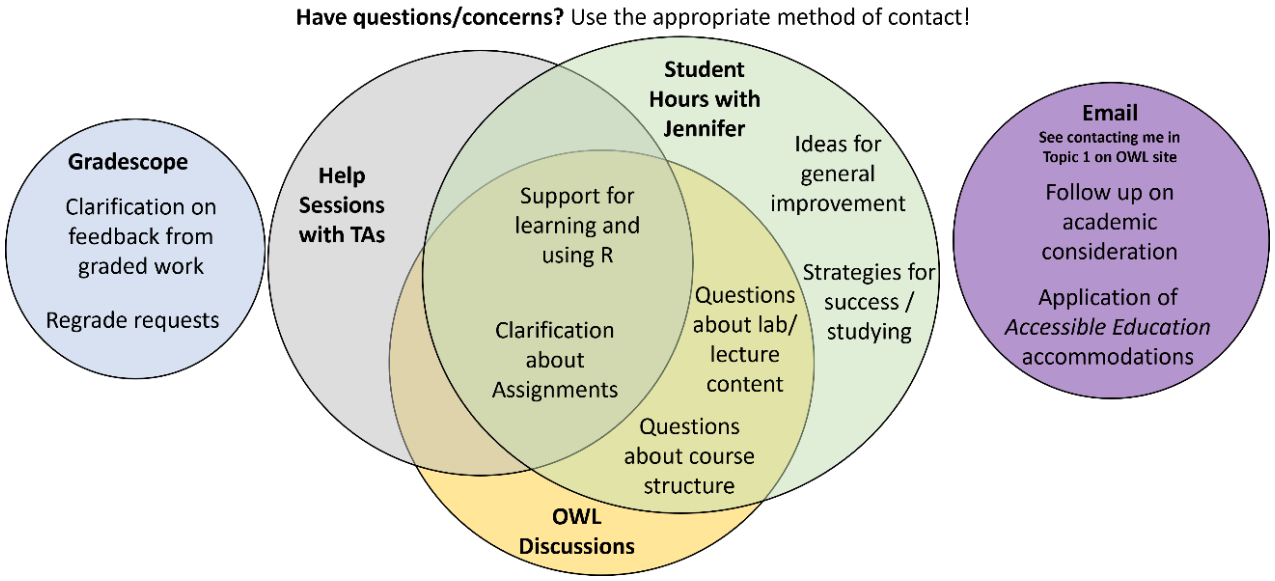
Contact Information

Email is used in a VERY restricted and limited manner in 2244. Email should only be used for discussions about academic consideration and accommodations. Please use other methods of communication as depicted in the diagram below. **Emails MUST have "2244A"** at the **start** of the subject line or they will not receive a response.

Response time: I triage communication when busy. That is, I prioritize answering questions that relate to assignments with upcoming deadlines, while delaying (if necessary) responses to requests that I deem as less time-sensitive (based on my experience). I also use class wide / group announcements for efficiency when deemed appropriate. Please be patient and watch for either a direct or larger (albeit, confidential) group response.

Methods of communication

- A **weekly OWL Announcement** will provide (i) reminders about pertinent policies and upcoming deadlines, (ii) clarification on assessment expectations, and (iii) responses to current frequently asked questions. You are expected to read the weekly Announcement and adhere to the content within.
- **Questions about course content** should be made on the **OWL Discussions** (asynchronous) and/or during **Student Hours with JP** (drop-in times to get support) and/or **Lectures.**
- **Regrade requests** must be sent **through Gradescope within one week** after grading is returned; such requests sent through any other method will not be addressed; this is for efficiency and organization.



Course Schedule and Delivery Mode

Universal Design for Learning

This course applies principles of **Universal Design for Learning** (UDL), which "focuses on eliminating barriers through initial designs that consider the needs of diverse people"[2]. You will encounter a combination of in-person, audio, video, and/or text-based resources, diagnostic assessments ("What do you know?") and "self-assessments" to help you efficiently allocate your time for learning; deadlines with automatic grace periods; and alternative course weighting schemes that acknowledge that mastery may occur at individualized rates.

Delivery of course material

This course is timetabled as a ***blended*** course; this means that the course content is a mixture (blend!) of online and in-person delivery. Specific to Biol/Stat 2244, ***lecture content*** is primarily in-person with some small online components, while ***lab content*** is delivered entirely online. Having a reliable internet connection, and, ideally, dedicated access to a laptop or desktop computer is required to be successful.

Timetable

Lectures

There are two (2) lecture sections (200 and 201) in the course; each section has 2 h of lecture per week. I try to keep the two lecture sections progressing through the material at the same pace. However, differences in questions and discussions that occur during class may result in the sections becoming about 5 minutes separated in pacing.

Labs

The lab component is online and asynchronous. Lab modules are planned into the Course Schedule (below); the expectation is that students will complete the relevant lab modules during the planned week, on their own time. Drop-in Help Sessions with TAs will be planned for those weeks, to ensure there is sufficient and appropriate support of your lab-related questions. The scheduling of the lab modules is also organized to ensure relevant skills/knowledge are completed for upcoming graded assessments that require their application. Plan to have 2 to 3 hours of lab tasks to work through most weeks, plus allocate time for suggested practice.

Course Schedule

The planned schedule for lecture topics, lab modules, and assessment deadlines/dates is provided in the table on the next page.

Some adjustments to the schedule may be made if issues are encountered during the course; any changes to deadlines/dates will be announced on OWL Announcements. For information on the Assessments (e.g. what is a "Meta Activity"?), see the section on Methods of Evaluation (pages 6-10).

[2] Novak, K. and T. Thibodeau. 2016. UDL in the Cloud: How to design and deliver online education using Universal Design for Learning. CAST, Inc., Wakefield, Massachusetts.

Week	Lecture/Lab Topics	Assessments due Friday at 11:55 pm	Exams
Sept 5 - 8	**Thurs, Sept 5:** no lecture (section 201)[3]		
Sept 9 - 15	PPDAC: A scientific inquiry framework Sampling designs & considerations		
Sept 16 - 22	Sampling designs & considerations, cont'd. Study designs & considerations **Lab:** Setting up R & R Studio	Meta Activity A	
Sept 23 – 29	Study designs & considerations, cont'd. **Lab:** Working with Data in R	Stat Activity 1	
Sept 30 – Oct 6	**Mon, Sept 30:** Day of Truth & Reconciliation (no lecture for section 200) **Tues, Oct 1:** no lecture (section 201)[3] Data structure **Lab**: Reproducible files using R markdown	Meta Activity B Stat Activity 2	
Oct 7 – 13	Summarizing & Exploring Data	Assignment 1: *Problem & Plan*	
Oct 14 – 20	**Reading Week** **(no classes/due dates Oct 12-20)**		
Oct 21 – 27	Parameters, Estimators, and Sampling distributions Modeling relationships **Lab 4:** Summarizing and Exploring Data in R		**Midterm (Tentative)**: Sun, Oct 27 6:00-8:00 pm
Oct 28 – Nov 3	Confidence intervals	Meta Activity C Stat Activity 3	**MAKEUP Midterm**: **(Tentative)**: Fri, Nov 1, 6:00-8:00 pm
Nov 4 – 10	P-values and null hypothesis testing	**Assignment 2:** *Data*	
Nov 11 – 17	Inference on one and two means **Lab:** inference on means in R	Stat Activity 4	
Nov 18 – 24	Inference on one and two proportions **Lab:** inference on proportions in R	Meta Activity D	
Nov 25 - Dec 1	Simple linear regression **Lab:** Simple Linear regression in R	Stat Activity 5	
Dec 2 - Dec 8	One-factor ANOVA and follow up analyses **Lab:** One-factor ANOVA in R **Dec 7-8:** Study Days	Assignment 3: *Analysis*	
Dec 9 - 22	**Final Exam Period** ***Do not schedule travel until the Final Exam schedule has been posted.***		

[3] No lectures are scheduled for Sept 5 or Oct 1 to ensure that both lecture sections have the same number of lecture periods across the term and to keep the lecture sections covering the same content during the same weeks.

Learning Outcomes

Statistics is a scientific discipline that informs all stages of research, from problem definition to conclusion. This course follows the PPDAC framework[4], focusing on knowledge/skills relevant to address questions that guide each stage of research. In addition, activities to help develop metacognition[5] are embedded alongside the statistical curriculum. A successful student will demonstrate proficiency with most of the following:

Design sampling and study procedures to collect relevant data addressing a research question	• Recognize and design common sampling and study design methods • Identify issues with sampling and study designs (e.g. bias, undercoverage, confounding, control, randomization, reproducibility) • Identify potential inference procedures and/or models based on research goal and data structure
Create and interpret appropriate summaries of data	• Select appropriate summaries based on research question and variables • Interpret common graphical and numerical summaries to describe patterns and features of univariate, bivariate, and/or multivariate data
Analyse data using inference procedures to address a research question	• Identify data structure characteristics (e.g. number of comparison groups, type of variables, paired vs. independent samples, etc.) • Interpret and describe confidence intervals and P-values • Evaluate model diagnostics for common parametric inference procedures
Use statistical software to summarize, analyse, interpret, and communicate data in a reproducible manner	• Create graphical and numerical summaries of data in R • Conduct inference procedures, including model diagnostics, in R • Interpret R (or other statistical software) output • Create reproducible analyses using R markdown and LaTeX
Communicate statistical concepts, analyses, and arguments in an accurate and scholarly manner	• Describe statistical concepts with appropriate vocabulary • Use conventional formats for reporting results of statistical analyses • Justify choices (e.g. study designs) with prioritization of data quality
Describe models and/or conceptual background for common inference procedures	• Describe and interpret simple linear models (e.g. $Y = \beta_1 x + \beta_0 + \varepsilon$) • Explain the role of sampling distributions and estimators in inference • Describe and apply characteristics of common probability distributions (e.g. binomial, Normal)
Engage in practices that support the development of metacognition	• Identify obstacles that may present challenges when learning • Reflect on learning to evaluate how the learner has changed • Use previous experiences as a framework to evaluate current or future actions

[4] Mackay, R.J., and R.W. Oldford. 2000. Scientific method, statistical method, and the speed of light. Statistical Science 15(3): 254-278.
[5] Metacognition is referred to as "thinking about your thinking". This involves understanding yourself as a learner, and being able to plan, monitor, and evaluate your learning. Well-developed metacognitive thinking is associated with better learning.

Course Materials

Required materials

These materials are "required" in that each student needs *access* to them to be successful in the course. In addition to these main resources, we will occasionally use freely available articles, videos, and applets to supplement your learning.

Students are responsible for checking the OWL site, **STATS 2244A 200: Statistics for Science** regularly. It provides the following content (*relevant OWL tools identified in parentheses*):

- Lecture and lab materials (*Content*)
- Assessment instructions/materials (*Assessments→Assignments*)
- Practice questions (*Content*)
- Communication tools (*Discussions*, *Announcements*)
- Due dates and help sessions (*Calendar*)

The **Labs** require using the statistical software program **R** and the integrated development environment, **R Studio**, to work with data and communicate. Both software packages are free to download to your personal computer (*best experience*) or for limited use through a browser (*if necessary*). Instructions for downloading / accessing R and R Studio is part of Lab 1.

If you need assistance with OWL, please seek support on the OWL Brightspace help page: brightspacehelp.uwo.ca. Alternatively, contact the Western Technology Services Helpdesk (by phone at 519-661-3800 or ext. 83800).

Methods of Evaluation

*This course uses **Specifications Grading** for some components; briefly, this means that there will be a list of requirements ('specifications') that all must be met to earn credit for a particular assessment and/or bundle in the grading scheme. The specifications for individual assessments will ALWAYS be communicated in advance. If—at ANY time—you are uncertain about expectations for an assessment or about the grading, ask for clarification. If you're interested in learning more about "Specs Grading" in general, there's a great blog post about it available here.*

Overview of Grading Distribution

The evaluation in this course is set up to recognize mastery of most material/skills *by the end* of the course, and to provide some opportunities to learn from mistakes; this is achieved through a flexible evaluation scheme. There are four (4) different types of assessment you will encounter: Assignments, Activities, the Midterm, and the Final Exam. The baseline weight of each component is described below. Three alternative weighting schemes are provided. **Your final course grade will automatically be calculated to give you the highest possible course mark at the end of the course.**

Component	Baseline	Alternative 1	Alternative 2	Alternative 3
Assignments	**30%**	30%	30%	30%
Activities	**15%**	15%	5%	5%
Midterm	**20%**	5%	20%	5%
Final Exam	**35%**	50%	45%	60%

Essential Requirements to pass Biol/Stat 2244

There are TWO (2) criteria that must be met for a student to be *eligible* to earn a passing grade (i.e. 50% or more) in Biology/Statistics 2244. These are:

- earning at least 15% for the Assignments component (described on page 8), **AND**,
- earning at least 40% on the Final Exam.

Failing to meet either and/or both of these two criteria will result in **a final course grade of 40%** (or your actual computed grade, whichever is lower), regardless of your achievements on other components of the course.

Assessment Descriptions

Each of the graded components of the course assessment are briefly described here; detailed instructions will be provided on the OWL site, under *Assessments→Assignments*. **Take time to review the section on General Information about Missed Coursework (page 11).**

Activities.

WHY? *Activities* are created to:

i. encourage regular engagement and review of lecture and lab content;
ii. provide low-stakes assessment of your application of course content before Exams and Assignments;
iii. give opportunities to engage in reflection and to develop metacognitive skills.

WHAT? There are two types of Activities: **Stat Activities** and **Meta Activities**. All involve answering a handful of questions (typically multiple choice, short answer, and possibly file/image uploads).

- Five (5) **Stat Activities** focus on concepts/skills recently covered in the lecture and/or lab materials (i.e. related to the *Stat*istical curriculum).
- Four (4) **Meta Activities** will ask you to reflect on your learning and/or submit evidence of your ongoing engagement with the course (i.e. related to the *Meta*cognitive curriculum).

HOW? All Activities will have instructions provided through the OWL Assessments→Assignments, with corresponding access to the Gradescope.ca submission (where relevant). You will typically have 5 days to work on and submit the Activity.

EVALUATION? **Stat Activities** are graded on a 3-level rubric using **F** = Full credit (highest level), **P** = Partial credit, and **N** = No credit (lowest level); details on what is required for each level will be described in the Stat Activity instructions. **Meta Activities** are graded on a 2-level rubric, as either **C** = Completed or **NC** = Not Completed. The total Activities component out of 15% will be based on the number and levels achieved for Stat and Meta Activities, as described in the following table; note that there are no intermediate grades (e.g., no possibility to obtain 14%):

To earn:	Achieve ALL of the following specifications:
15	• submit at least **4 Stat Activities**, earning at least **4** level **F** • earn level **C** for at least **3 Meta Activities**
12	• submit at least **4 Stat Activities**, earning at least **3** level **F** and no more than one level **N** • earn level **C** for at least **2 Meta Activities**
9	• Submit at least **3 Stat Activities**, earning at least **2** level **F** and no more than one level **N** • earn level **C** for at least **2 Meta Activities**
6	• Submit at least **3 Stat Activities**, earning at least **3** level **P**
3	• Submit at least **2 Stat Activities**, earning at least **1** level **F AND 1** level **P**
0	Assigned if the 3% specifications are not met.

For Alternative weighting schemes (see page 6) in which Activities contribute only 5%, the value out of 15% from the above table will be rescaled out of 5%. Example, earning the 12% bundle would be rescaled to 12/15 x 5% = 4%.

ACADEMIC CONSIDERATION?

- **48-h No-Late-Penalty Period**: You are expected to submit each **Stat Activity** and **Meta Activity** by the Friday 11:55 pm deadline. If you miss that deadline, you may submit the Activity up to 48 h late without penalty (there is no need to request Academic Consideration during this 48-h period). No Activities will be accepted *late* after the end of the 48-h No-Late-Penalty Period.
- **Flexible Completion**: Only 4 of the 5 ***Stat Activities***, and 3 of the 4 ***Meta Activities*** are counted towards your final grade for Activities. You do not need to request Academic Consideration for the first Stat Activity and first Meta Activity missed; requests for Academic Consideration for the first Stat and first Meta Activity will be denied. Any missed Stat Activities and/or Meta Activities ***after the first*** of each type must be accompanied by Academic Consideration that starts before the original Friday 11:55 pm deadline and extends beyond the end of the 48-h No-Late-Penalty Period.
    - For the 2nd **Stat Activity** missed and Academic Consideration is received, the Activity can be submitted until the first Wednesday (by 11:55 pm) after the original Friday deadline, or, the specifications for the Activities grade will be rescaled to remove the Activity.
    - For the 3rd, 4th, and/or 5th **Stat Activities** missed and Academic Consideration is received, the Activity can be submitted until the first Wednesday (by 11:55 pm) after the original Friday deadline; otherwise, an alternative version of the Activity will be completed at a later date.
    - For the 2nd, 3rd, or 4th **Meta Activity** missed and Academic Consideration is received, the Activity can be submitted until the first Wednesday (by 11:55 pm) after the original Friday deadline; otherwise, an alternative version of the Activity will be completed at a later date.

Assignments.

WHY? The *Assignments* assess your level of achievement on a core subset of course-learning outcomes (see **page 5**) in an authentic manner, with heavy emphasis on your use of R, R markdown file format, and LaTeX.

WHAT? The three (3) *Assignments* are each composed of a few short-answer questions requiring written responses (possibly including graphs/tables and/or R code and output). The *Assignments* move progressively through the stages of the PPDAC framework[6]. These involve answering questions related to an overall research objective and summarizing/analysing real data.

HOW? All assignments are take-home assignments, to be completed individually; You will typically have 7-9 days to work on and submit the Assignments. All Assignments must be uploaded to the OWL Assessments→Assignments, AND to the corresponding Gradescope.ca submission.

EVALUATION? Each *Assignment* assesses your achievement on a group of three (3) course-level learning outcomes (see page 5); your achievement of each outcome is graded against a 4-level rubric using **M** = Mastery (highest level), **P** = Proficiency, **A** = Approaching proficiency, **N** = Not met (lowest level); details about these levels are provided with the Assignment instructions. The total Assignments component out of 30% will be based on the levels achieved across the three Assignments, as described in the following table (there is no possibility of intermediate grades (e.g. no possibility to obtain 26%).

To earn:	**Achieve ALL of the following specifications:**
30	earn **9** level **M**
28	earn **8** level **M**, and, no level **A** or **N**
25	earn at least **6** level **M**, no more than **1** level **A**, and no level **N**
20	earn at least **5** level **P**, no more than **2** level **A** and no more than 1 level **N**
17	earn at least **5** level **P**, no more than **3** level **A** and no more than **1** level **N**
15	earn at least **5** level **P** and no more than **2** level **N**
Failing to meet the specifications for the lowest level Assignments grade (15) will simply result in a **final course grade of 40%**, regardless of your achievements on other components of the course.	

[6] Mackay, R.J., and R.W. Oldford. 2000. Scientific method, statistical method, and the speed of light. Statistical Science 15(3): 254-278.

ACADEMIC CONSIDERATION?

48-h No-Late-Penalty Period: You are expected to submit each Assignment by the Friday 11:55 pm deadline. If you miss that deadline, you may submit the Assignment up to 48 h late without penalty (there is no need to request Academic Consideration during this 48-h period; requests for Academic Consideration during this 48-h period will be denied). After the end of the 48-h No-Late-Penalty Period, you can submit Assignments up to the first Wednesday (by 11:55 pm) after the original Friday deadline, ***with a late penalty*** of one rubric level for each 24 h or part thereof (e.g. level M→level **P**, level P→level A, etc.); this is a steep late penalty and should be avoided unless significant improvements in the Assignment submission can be gained by submitting late.

To be exempt from the late penalty, Academic Consideration that starts before the Friday 11:55 pm deadline and lasts longer than the 48-h No-Late-Penalty Period is required. If such Academic Consideration is obtained, you can submit the Assignment until the first Friday (by 11:55 pm) after the original Friday deadline (i.e. 7 days after the deadline), or, until a solutions file is posted (whichever comes sooner). Otherwise, you will be required to complete an alternative version of the Assignment at a later date. All three (3) Assignments are part of the Essential Requirements for the course; consequently, **missed Assignments must have Academic Consideration,** otherwise your **final course grade will be submitted as 40%** (or your actual computed grade, whichever is lower), regardless of your achievement on other graded course components.

Midterm.

WHY? The *Midterm* assesses your understanding, application, and integration of the course material from the first half (roughly) of the course.

WHAT? The *Midterm* will be composed of several short answer questions and some multiple-choice questions; questions may involve calculations, drawings, etc. The Midterm is closed-book, but you may bring a "One-Pager" (i.e. a single-sided 8.5" x 11" page with notes, reminders, etc.) and a non-programmable calculator.

HOW? The *Midterm* will be in-person on Western campus; each student will be assigned to a location to write.

EVALUATION? The Midterm is graded on a traditional points-based scale. Consequently, your grade will be calculated according to the following formula:

$$\frac{achieved\ points\ on\ exam}{total\ possible\ points\ for\ exam} \times \%\ exam\ weighting$$

For example, if a student earns 22 out of a possible 30 points on the Midterm, then their Midterm component (15%, based on the Baseline distribution from page 6) will be (22/30) x 15% = 11%.

ACADEMIC CONSIDERATION?

Absences for the Midterm **always require supporting documentation when requesting Academic Consideration.** Students who miss the Midterm *without* Academic Consideration, or, who request Academic Consideration *without* supporting documentation will have their Midterm grade recorded as zero (0). Students who are granted Academic Consideration with supporting documentation will be eligible to write the Make up Midterm. Students who are scheduled to write the make-up *Midterm*, but cannot due to conflict or other circumstances that are accommodated by Academic Consideration with supporting documentation will have their *Final Exam* reweighted accordingly.

Final Exam.

WHY? The *Final Exam* assesses your understanding, application, and integration of the course material at the end of the course, including some application of the skills/concepts associated with the statistical software, R.

WHAT? A **cumulative** exam with a combination of multiple choice and short answer questions, which may involve calculations, drawings, and interpretation of data. The *Final Exam* is closed-book, but you may bring

a “One-Pager” (i.e. a single-sided 8.5” x 11” page with notes, reminders, etc.) and a non-programmable calculator.

HOW? The *Final Exam* will be in-person on Western campus at a time/location scheduled by the University Registrar.

EVALUATION? The Final Exam is graded using a traditional points-based scale, as described above for the Midterm.

ACADEMIC CONSIDERATION?
Absences for the Final Exam **always require supporting documentation when requesting Academic Consideration.** Students who miss the Final Exam *without* Academic Consideration will have their **final course grade submitted as 40%** (or your actual computed grade, whichever is lower), regardless of your achievement on other course components; this is because earning at least 40% on the Final Exam is an Essential Requirement. Students who are granted Academic Consideration will be eligible 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 students who miss multiple final exams within one examination period.

2244 Policy on use of Artificial Intelligence generative tools

Artificial Intelligence (AI) tools (i.e. large language models, natural language processing applications, chatbots; e.g. ChatGPT, DALL-E 2, Sudowrit, Grammarly, etc., etc.) are accessible to the general public. Discussions have been prolific about how and why such AI tools should/shouldn’t be used in academia; there is little agreement and a lot to learn. For THIS course (i.e. where transparency and reproducibility of data are key values), I have a developed a policy on AI tool use that we will follow as a learning community. **You should take a few minutes to review the *complete* policy—which includes a discussion of the philosophy behind the policy, and the concerns about the accuracy, bias, and transparency of AI tools—, that is available on the OWL course site.** If any part of that policy is confusing or uncertain, reach out to the instructor for a conversation before submitting your work. Note that violations of this policy are considered violations of Western’s academic integrity and scholastic offense policies. An ‘executive summary’ of the policy is provided here:

1. Any assessments that were created with the help of AI tools (at any point in completing the assessment) should clearly indicate (by descriptive narrative) what work/ideas are yours and what content/ideas were generated by the AI tool.
2. You must cite the tool(s) used. For example, if using ChatGPT-4, you would cite using a format such as: "*ChatGPT-4. (YYYY, Month DD of query). "Text of your query." Generated using OpenAI. https://chat.openai.com/*".
3. In cases where AI tools are used, no more than 25% of the submitted work should be generated by AI.
4. Keep transcripts of your “conversations” (prompts plus responses) as documentation/support of your use. A simple approach to take is to use screenshots.

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*** in 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. Requests for mark “bumping” will be (politely) denied. Similarly, requests for alternative assessments, submission of revisions of assessments to increase marks, or requests for ‘exceptions’ to a grading scheme will be (politely) denied on the basis that making such exceptions lacks transparency and reduces equity among students in the course.

Accommodation and Accessibility

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 policy can be found at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf

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.

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 to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible but not later than two weeks prior to the writing or the examination (or one week prior to the writing of the test). Please visit the Diversity Calendar posted on our University's EDID website for the recognized religious holidays: https://www.edi.uwo.ca.

Academic Policies

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://www.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); this refers to the **Final Exam**.
- The **Midterm Exam**

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those identified as Coursework with Assessment Flexibility (this refers to **Activities** that have the 48-h No-Late-Period and Flexible Completion, and **Assignments** that have the 48-h No-Late-Period), the request cannot be recalled and reapplied. This privilege is forfeited.

Additional 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.

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.

Personal response devices ("clickers") or similar technology may be used in this course for the purpose of engagement during in-person learning and/or to provide informal feedback to your instructor about student understanding. Such technology use will not contribute to course grades. Any personal data collected (e.g. student usernames/identification and responses to questions) will be treated like other confidential course-related data.

In the event of a university-declared emergency that requires some or all of the course to be delivered online, tests and examinations in this course may 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 would, consequently, 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.

Professionalism & Privacy

Western students are expected to follow the Student Code of Conduct, available for review at https://www.uwo.ca/univsec/pdf/board/code.pdf. Additionally, the following expectations and professional conduct apply to this course:

- Students are expected to contribute to an inclusive and safe learning environment (online and in-person) that recognizes individual diversity and experience
- All course materials created by the instructor(s) are copyrighted and cannot be sold/shared
- Recordings are not permitted (audio or video) without explicit written permission of the instructor
- Permitted recordings are not to be distributed
- Students will be expected to take an academic integrity pledge before some assessments
- All recorded sessions will remain within the course site or unlisted if streamed

Remote learning sessions for this course may be recorded.

Occasionally, I use remote learning technology (e.g. Zoom) for Student Hours or other purposes; these learning sessions may 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 sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

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 lectures, labs, tests/quizzes, assignments, midterms, activities, 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.

Support Services

Please visit the Science & Basic Medical Sciences Academic Advising 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.

Learning-skills counsellors at the Learning Development and Success (http://www.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, http://westernusc.ca/services.