

WESTERN UNIVERSITY  
LONDON CANADA  
Department of Psychology  
2022-2023

Psychology 2812B Section 001  
Statistics for Psychology II

## 1.0 CALENDAR DESCRIPTION

In this course, students learn advanced data analytic techniques for psychological research. Topics include advanced analyses within the general linear model (GLM), e.g., multiple and logistic regression, as well as special applications of the GLM such as ANOVA. Students continue to gain experience in computer-based analytic methods and coding techniques.

Antirequisites: the former Psychology 2810; the former Psychology 2820E

**Antirequisites are courses that overlap sufficiently in content that only one can be taken for credit. If you take a course that is an antirequisite to a course previously taken, you will lose credit for the earlier course, regardless of the grade achieved in the most recent course.**

Prerequisites: At least 70% in Psychology 2811A/B. A minimum mark of 60% in both Data Science 1000A/B and 0.5 math course and special permission of the department.

2 lecture hours; 2 laboratory hours; Course Weight: 0.5

Enrollment in this course will be by special permission only. Restricted to Psychology programs, Honours Developmental Cognitive Neuroscience, Psychology special students and Scholars Electives

Unless you have either the prerequisites for this course or written special permission from your Dean to enrol 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.

## 2.0 COURSE INFORMATION

Instructor: Dr. Paul Gribble  
Office: WIRB 4122  
Office Hours: tba  
Email: pgribble@uwo.ca

Teaching Assistant(s): tba

Time and Location of Classes: Lectures: Wednesdays 12:30 pm – 2:30 pm in SEB-1200  
Labs: varies (see OWL course site)

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

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also contact Accessible Education at [aew@uwo.ca](mailto:aew@uwo.ca) or 519-661-2147.

## 3.0 TEXTBOOK

We will be using freely available web-based resources (tba).

## 4.0 COURSE OBJECTIVES & LEARNING OUTCOMES

The aim of this course is to advance students' statistical acumen by focusing on a family of analytic techniques that rely on the General Linear Model (GLM). Students will develop statistical knowledge by coding a variety of statistical tests, interpreting test output and visualizing their results. They will enhance their data science skills by learning to use advanced data visualization toolkits and code in R and RStudio, a free software environment for statistical computing and graphics.

### 4.1 STUDENT LEARNING OUTCOMES

Learning Outcome	Learning Activity	Assessment
<p><i>Depth and Breadth of Knowledge.</i></p> <p>Demonstrate knowledge of various uses of the GLM in hypothesis testing.</p>	Lectures; readings; lab activities	Weekly homework; Exams
<p><i>Application of Knowledge.</i></p> <p>Interpret both graphical and statistical evidence to understand data and make conclusions.</p> <p>Recognize from data and/or study design descriptions which statistical tests should be used.</p>	Lectures; readings; lab activities  Lectures; readings; lab activities	Weekly homework; Exams  Weekly homework; Exams
<p><i>Application of Methodologies.</i></p> <p>Produce code to accurately calculate statistical tests and generate data visualizations.</p> <p>Understand the implications of statistical assumptions in hypothesis testing.</p> <p>Demonstrate advanced data wrangling skills by compiling complex data sets.</p>	Lectures; readings; lab activities  Lecture, lab activities  Lab activities	Weekly homework; Exams; Coding assignment  Weekly homework; Exams  Weekly homework; Exams; Coding assignment
<p><i>Awareness of Limits of Knowledge.</i></p> <p>Explain the strengths and limitations of the GLM in statistical decision-making.</p>	Lectures; readings	Weekly homework; Exams

## 5.0 EVALUATION

The evaluation and testing formats for this course were created to assess the learning objectives as listed in section 4.0 and are considered necessary for meeting these learning objectives.

The course requirements, along with relative weightings in the determination of final grades, are:

- Weekly Homework 30% (3% each x 10 required homework assignments)
- Midterm Exam 35%
- Final Exam 35%

All elements of the coursework (including exams) are necessary for meeting the core learning outcomes of the course.

**Weekly Homework (30%):** Each week you will complete a set of homework problems in an RStudio notebook. These will be based on the lecture material for the week. The RStudio notebook with the assignment will be released on OWL after lecture each Wednesday. It will be due 9 days later, on Friday at 5pm. The final homework will be due April 7. You must upload the notebook file (.Rmd file) to the homework portal on OWL. There are a total of 10 homework assignments in the course (3% each). The solution to the homework assignments will be posted on Mondays at 12:00 pm. If your homework has not been submitted before the solution is posted, you will receive a grade of zero.

**Exams (70%):** There will be two in-person, proctored exams in the course. The midterm will cover the course material in weeks 1-6. The final exam will be cumulative based on all course material from weeks 1-13. The exams will include multiple-choice/matching/fill-in-the-blank questions, and short answer questions assessing your understanding of key concepts, as well as your ability to perform data visualization and statistical tests, and interpret them. These will be similar to the weekly homework assignments.

The midterm will be available during the regular lecture time. You will have 1 hour and 50 minutes to complete it. The final exam (date/time to be announced) will be 3 hours long. You must take the exams in person (if you are an accommodated student, you must take the exam with the accommodated exams office). Attendance will be taken. If the course staff do not have a record of your presence in the exam room and you submit an exam that you have taken elsewhere, you will receive a grade of zero. The answers on the exam must be your own work and you must complete the exam independently. If there is evidence that you worked with another student on the exam or that the work is not your own, you will receive a grade of zero on the exam.

For both the midterm and final exams you will be permitted to use one "cheat sheet", which must be in the form of a single piece of letter-sized paper. You may have notes on both sides of the page. No other resources may be used in the exams. Calculators are not required nor permitted.

### 5.1 POLICY ON MISSING COURSEWORK

**Weekly Homework:** Homework is due at 5:00 pm on Friday evening each week (starting in week 2). The final homework will be due April 7. The solution to the homework will be released the following Monday at 12:00 pm. For each 24-hour period (or portion thereof) that your homework is late until Monday at 12:00 pm, it will incur a penalty of 0.5% (out of 3%). There is no need to email the course staff about late homework, as the submission portal will remain available until the answer key is released. The homework mark will automatically reflect the late penalty. If your homework has not been completed by the time the answer key is released, it will receive a score of 0. If you miss several homework assignments due to a long-term illness or other issue of concern, please contact academic counselling in your home faculty with appropriate documentation to request relief. If academic counselling approves your request, the missed homework marks will be added to the weighting of final exam mark. This will make the final exam worth a larger proportion of the total mark.

**Exams:** If you need to miss an exam due to illness or other issue, you **MUST** request relief from academic counselling. Without an approved accommodation from academic counselling, you will not be allowed to take the exam. There will be one opportunity to make up each missed exam. The make-up exam for the MIDTERM will be Saturday March 25, 2023 at 10:30 am (room TBD). The make-up exam for the FINAL will be held on Saturday May 20, 2023 at 10:30 am (room TBD). Note that the make-up exams will include new test questions and datasets. They will consist of a format similar to the exams they replace.

## 5.2 IMPORTANT NOTES ABOUT COURSE GRADES

The expectation for course grades within the Psychology Department is that they will be distributed around the following averages:

70%	1000-level to 2099-level courses
72%	2100-2999-level courses
75%	3000-level courses
80%	4000-level courses

The Psychology Department follows Western's grading guidelines, which are as follows (see: [https://www.uwo.ca/univsec/pdf/academic\\_policies/general/grades\\_undergrad.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/general/grades_undergrad.pdf))

A+	90-100	One could scarcely expect better from a student at this level
A	80-89	Superior work that is clearly above average
B	70-79	Good work, meeting all requirements, and eminently satisfactory
C	60-69	Competent work, meeting requirements
D	50-59	Fair work, minimally acceptable
F	below 50	Fail

Note that in the event that course grades are significantly higher or lower than these averages, instructors may be required to make adjustments to course grades. Such adjustment might include the normalization of one or more course components and/or the re-weighting of various course components.

Policy on Grade Rounding: Please note that although course grades within the Psychology Department are rounded to the nearest whole number, no further grade rounding will be done. No additional assignments will be offered to enhance a final grade; nor will requests to change a grade because it is needed for a future program be considered. To maximize your grade, do your best on each and every assessment within the course.

## 6.0 ASSESSMENT/EVALUATION SCHEDULE

**Weekly Homework:** After lecture each week a new homework will be released on OWL. The homework will be related to that week's lecture and will be due on Friday at 6pm of the following week. The final homework will be due April 10. You will upload your homework to the OWL course site.

**Midterm Exam:** March 1, 2023 (in class)

**Final Exam:** April exam period (exact time/location tba)

\*For the final exam, the date and time are set by the **Office of the Registrar**. You can view the active exam schedules here: [https://registrar.uwo.ca/academics/examinations/exam\\_schedule.html](https://registrar.uwo.ca/academics/examinations/exam_schedule.html)

## 7.0 CLASS SCHEDULE

Week	Date	Topic	Homework (due)
1	Jan 11	RStudio	HW 1 (Jan 20)
2	Jan 18	Data wrangling & visualization I	HW 2 (Jan 27)
3	Jan 25	Data wrangling & visualization II	HW 3 (Feb 3)
4	Feb 1	Bivariate Correlation & Intro to Linear Regression	HW 4 (Feb 10)
5	Feb 8	Linear Regression II & Intro to Multiple Regression	HW 5 (Feb 17)
6	Feb 15	Multiple Regression II	HW 6 (Mar 3)

7	Feb 23	reading week	--
8	Mar 1	<b>Midterm Exam</b> (in class)	--
9	Mar 8	Oneway ANOVA & the GLM	HW 7 (due Mar 17)
10	Mar 15	Oneway ANOVA: follow-up tests	HW 8 (due Mar 24)
11	Mar 22	Factorial ANOVA: main effects & interactions	HW 9 (due Mar 31)
12	Mar 29	Factorial ANOVA: follow-up tests	HW 10 (due Apr 7)
13	Apr 5	Repeated Measures ANOVA	--
	TBA	<b>Final Exam</b> (location TBA) (Exam tests content from the entire course)	

## 8.0 LAND ACKNOWLEDGEMENT

We acknowledge that Western University is located on the traditional lands of the Anishinaabek, Haudenosaunee, Lūnaapéewak and Attawandaron peoples, on lands connected with the London Township and Sombra Treaties of 1796 and the Dish with One Spoon Covenant Wampum.

With this, we respect the longstanding relationships that Indigenous Nations have to this land, as they are the original caretakers. We acknowledge historical and ongoing injustices that Indigenous Peoples (e.g. First Nations, Métis and Inuit) endure in Canada, and we accept responsibility as a public institution to contribute toward revealing and correcting miseducation, as well as renewing respectful relationships with Indigenous communities through our teaching, research and community service.

## 9.0 STATEMENT ON ACADEMIC OFFENCES

Students are responsible for understanding the nature and avoiding the occurrence of plagiarism and other scholastic offences. Plagiarism and cheating are considered very serious offences because they undermine the integrity of research and education. Actions constituting a scholastic offence are described at the following link:

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

As of Sept. 1, 2009, the Department of Psychology will take the following steps to detect scholastic offences. All multiple-choice tests and exams will be checked for similarities in the pattern of responses using reliable software, and records will be made of student seating locations in all tests and exams. All written assignments will be submitted to TurnItIn, a service designed to detect and deter plagiarism by comparing written material to over 5 billion pages of content located on the Internet or in TurnItIn's databases. 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 Western and Turnitin.com (<http://www.turnitin.com>).

Computer-marked multiple-choice tests and/or exams will be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

In classes that involve the use of a personal response system (PRS), data collected using the PRS will only be used in a manner consistent to that described in this outline. It is the instructor's responsibility to make every effort to ensure that data remain confidential. However, students should be aware that as with all forms of electronic communication, privacy is not guaranteed. Your PRS login credentials are for your sole use only. Students attempting to use another student's credentials to submit data through the PRS may be subject to academic misconduct proceedings.

Possible penalties for a scholastic offence include failure of the assignment/exam, failure of the course, suspension from the University, and expulsion from the University.

## 10.0 POLICY ON THE USE OF EXAM PROCTORING SOFTWARE

If a remote proctoring service is used, the service will require you to provide **personal information** (including some biometric data). The session will be **recorded**. In the event that in-person exams are unexpectedly canceled, you may only be given notice of the use of a proctoring service a short time in advance. More information about remote proctoring is available in the Online Proctoring Guidelines. Please ensure you are familiar with any proctoring service's technical requirements before the exam. Additional guidance is available at the following link: <https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf>

\* 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. See this link for technical requirements: <https://support.zoom.us/hc/en-us>

## 11.0 POLICY ON ACCOMMODATION FOR ILLNESS OR OTHER ABSENCES

Western's policy on Accommodation for Medical Illness can be found at: [https://www.westerncalendar.uwo.ca/PolicyPages.cfm?PolicyCategoryID=1&Command=showCategory&SelectedCalendar=Live&ArchiveID=#Page\\_12](https://www.westerncalendar.uwo.ca/PolicyPages.cfm?PolicyCategoryID=1&Command=showCategory&SelectedCalendar=Live&ArchiveID=#Page_12)

If you experience an extenuating circumstance (e.g., illness, injury) sufficiently significant to temporarily make you unable to meet academic requirements, you may request accommodation through the following routes:

- i. For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner in order to be eligible for Academic Consideration;
- ii. For non-medical absences, submitting appropriate documentation (e.g., obituary, police report, accident report, court order, etc.) to Academic Counselling in their Faculty of registration in order to be eligible for academic consideration. Students are encouraged to contact their Academic Counselling unit to clarify what documentation is appropriate.

Students must see the Academic Counsellor and submit all required documentation in order to be approved for certain accommodation.

[https://www.registrar.uwo.ca/faculty\\_academic\\_counselling.html](https://www.registrar.uwo.ca/faculty_academic_counselling.html)

Students seeking academic consideration:

- are advised to consider carefully the implications of postponing tests or midterm exams or delaying handing in work;
- **must communicate with their instructors no later than 24 hours** after the end of the period covered SMC, or immediately upon their return following a documented absence

Students seeking accommodation for religious purposes are advised to contact Academic Counselling at least three weeks prior to the religious event and as soon as possible after the start of the term.

## 12.0 CONTINGENCY PLAN FOR RETURN TO LOCKDOWN: IN-PERSON & BLENDED CLASSES

In the event of a COVID-19 resurgence or any other event that necessitates the course delivery moving away from face-to-face interaction, all remaining 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.

## 13.0 STATEMENTS CONCERNING ONLINE ETIQUETTE

In courses involving online interactions, the Psychology Department expects students to honour the following rules of etiquette:

- please "arrive" to class on time

- please use your computer and/or laptop if possible (as opposed to a cell phone or tablet)
- please ensure that you are in a private location to protect the confidentiality of discussions in the event that a class discussion deals with sensitive or personal material
- to minimize background noise, kindly mute your microphone for the entire class until you are invited to speak, unless directed otherwise
- In classes larger than 30 participants please turn off your video camera for the entire class unless you are invited to speak
- In classes of 30 students or fewer, where video chat procedures are being used, please be prepared to turn your video camera off at the instructor's request if the internet connection becomes unstable
- Unless invited by your instructor, do **not** share your screen in the meeting

The course instructor will act as moderator for the class and will deal with any questions from participants. To participate please consider the following:

- If you wish to speak, use the "raise hand" function and wait for the instructor to acknowledge you before beginning your comment or question.
- Please remember to unmute your microphone and turn on your video camera before speaking.
- Self-identify when speaking.
- Please remember to mute your mic and turn off your video camera after speaking (unless directed otherwise).

General considerations of "netiquette":

- Keep in mind the different cultural and linguistic backgrounds of the students in the course.
- Be courteous toward the instructor, your colleagues, and authors whose work you are discussing.
- Be respectful of the diversity of viewpoints that you will encounter in the class and in your readings. The exchange of diverse ideas and opinions is part of the scholarly environment. "Flaming" is never appropriate.
- Be professional and scholarly in all online postings. Use proper grammar and spelling. Cite the ideas of others appropriately.

Note that disruptive behaviour of any type during online classes, including inappropriate use of the chat function, is unacceptable. Students found guilty of Zoom-bombing a class or of other serious online offenses may be subject to disciplinary measures under the Code of Student Conduct.

## 14.0 OTHER INFORMATION

Office of the Registrar: <https://registrar.uwo.ca>

Student Development Services: [www.sdc.uwo.ca](http://www.sdc.uwo.ca)

If you wish to appeal a grade, please read the policy documentation at:

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

Please first contact the course instructor. If your issue is not resolved, you may make your appeal to the Undergraduate Chair in Psychology ([psyugrd@uwo.ca](mailto:psyugrd@uwo.ca)).

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*Policy on the Recording of Synchronous Sessions:* Some or all of the remote learning sessions for this course (if scheduled) 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 privately record the sessions, except where recording is an approved accommodation, or the student has the prior written permission of the instructor.