University of Waterloo
Department of Psychology
Psychology 292
Basic Data Analysis
Winter 2018

Lectures

Tuesdays and Thursdays, 10:00 – 11:20am, AL 116

Course Description

In this course, you will learn the basics of using descriptive and inferential statistics in the analysis of psychological data. This course emphasizes an understanding of fundamental statistical principles rather than "cookbook" application of statistical formulas. The principles provided in this course will serve as a foundation for more advanced statistical techniques that you may study in later courses. An appreciation of basic statistical principles, furthermore, can help you to be a more critical "consumer" of reported research findings.

Instructor Information

Instructor: Derek Koehler
Office: PAS 4050
Office Hours: by appointment
Email: dkoehler@uwaterloo.ca

TA Information

T.A.	Email (@uwaterloo.ca)	Office	Office Hours	Tutorial
Liz Attisano	liz.attisano	PAS 4022	Wednesday, 12:00 PM - 1:00 PM	102
Adam Francey	alzfranc	PAS 2254*	Wednesday, 3:00 PM - 4:00 PM	105
Mike Klein	mdklein	PAS 4043	Tuesday, 9:00 AM - 10:00 AM	104
Kaiden Stewart	kaiden.stewart	PAS 4211*	Monday, 1:00 PM - 2:00 PM	101
Andriy Struk	astruk	PAS 2245*	Monday, 5:00 PM - 6:00 PM	103
Mona Zhu	mona.zhu	PAS 4211*	Thursday, 1:00 PM - 2:00 PM	106

*Note: You will need to go through an unlocked door marked "lab personnel only" to reach this office.

Tutorials

Section 101:	Tuesdays	6:30 PM – 7:50 PM	HH 138
Section 102:	Wednesdays	8:30 AM – 9:50 AM	DWE 3519
Section 103:	Wednesdays	4:00 PM – 5:20 PM	DWE 3519
Section 104:	Thursdays	8:30 AM – 9:50 AM	DWE 3519
Section 105:	Wednesdays	5:30 PM – 6:50 PM	DWE 3519
Section 106:	Tuesdays	5:30 PM – 6:50 PM	DWE 3519

Waterloo LEARN (D2L) for Psychology 292

I will be using the University of Waterloo's LEARN system to post the course syllabus, lecture notes, tutorial materials, problem sets, grades, and and other resources you may find useful. Course announcements, and answers to frequently asked questions will also be posted on LEARN. Please be

sure you check your LEARN account regularly to stay on top of the material in the course and any announcements.

Required Text

In lieu of a traditional textbook, students will be asked to subscribe to an online "course" called Statistical Reasoning, which is part of the Open Learning Initiative (OLI) at Carnegie Mellon University. The cost of registering is US$12, which is considerably less than a traditional hardcopy textbook.

- Go to OLI's website (http://oli.cmu.edu/), and "sign up" (top right corner)
- Enter your full first name and last name, as they appear on LEARN
- **Important:** Enter your uWaterloo email address as your "Account ID". If you do not, we will not be able to match your records across the OLI and LEARN systems, **and you will not receive grades for your assignments.**
- Once you have finished signing up, a page called "My Courses" will appear. Under my academic courses, enter the following course key: **3177LEC001**

Course Requirements and Assessment

Assessment	Weighting	
14 Checkpoints	10%	(online, average of 12 best scores)
3 Unit Tests	60%	(held in class, collectively worth 60%)
Final Exam (Cumulative)	30%	(held during final exam period)
Total	**100%**	

Online Checkpoints (10%)

You will be asked to complete these relatively brief, online assessments through OLI's website (http://oli.cmu.edu). The checkpoints are intended to check your comprehension of and keep you on track with the assigned reading. There are 14 assigned checkpoints in total. If necessary, you can miss two as final marks are based on the best 12 of 14 checkpoint scores. You are allowed up to two attempts at each checkpoint and will receive feedback on each attempt. Your final score for each checkpoint will be determined by the percentage of correctly answered items from your best-scoring attempt.

Checkpoint(s)	Due Date	Topic
1	January 12	Examining Distributions 1
2	January 19	Examining Distributions 2
3	February 2	Random Variables
4 **and** 5	February 9*	Sampling Distributions 1 and 2
6	February 16	Estimation
7 **and** 8	March 2*	Hypothesis Testing for population Proportion and Population Mean
9 **and** 10	March 9*	Two Independent Samples and Matched Pairs
11 **and** 12	March 23 *	Examining Relationships 1 and 2
13 **and** 14	April 2*	Case C -> C and Q -> Q and Inferences for Relationships

*Please note that there are two checkpoints due on these dates

Unit Tests (60%)

Three unit tests will be held in class. You will have 60 minutes to complete each test. Technically, the three tests are non-cumulative, but topics covered in this course naturally build on one another. For example, to carry out a t-test (covered on Test 3), you need to know how to calculate a standard deviation (covered on Test 1). All unit tests are closed-book, but sheets with relevant statistical formulas and tables will be provided so you won't have to memorize them. You can preview the formula sheets on LEARN.

The three unit tests, taken together, will account for 60% of your final mark. Your highest test score will count for 25% and your lowest for only 15%, with the intermediate score counting for 20%. This should help to offset, at least somewhat, the effects of a having "bad day" on one of the unit tests. Out of fairness to other students, please note that the instructor cannot offer any further changes in the weighting of the unit tests and final exam, or additional work for extra credit.

If you have a concern about how an item on a unit test was marked, please first have a look at the answer key (posted on LEARN for Psych 292). If the answer key does not address your concern, please arrange to discuss the matter further with the TA who marked the item. (The answer key will indicate who marked each item.) If you still feel that your concern has not been addressed, please put it in writing and submit it to the instructor, who will then discuss it with the TA and make a final decision.

Final Exam (30%)

The final exam is closed-book and cumulative. For the final exam, sheets with relevant statistical formulas and tables will be provided so you won't have to memorize them. Students may also bring and use one additional (double-sided) page of their own notes. This sheet may be hand-written or typed.

Missed/Late Work

Missed Checkpoints

Online checkpoints are due by 23:59 (11:59 PM) on their designated due dates. Students will not be able to submit checkpoints after this time. Missed checkpoints will receive a grade of zero (no exceptions).

Missed Unit Tests

Unit tests or exams can only be rescheduled in the case of illness (or other medical problems); circumstances of serious distress due to a family emergency or personal crisis; or (for those students who commute) adverse weather on the day of tests. Documentation is required in order to reschedule a test or exam. In the case of illness, a UW verification of illness form is required.

It is important to be aware that, in such cases, the only accommodation that can be offered is rescheduling the test or exam. Once the test or exam has been completed, poor performance due to circumstances such as those outlined above cannot be used as a basis for requesting re-weighting the contribution of the test or exam to the student's final course mark.

A rewrite session will be scheduled for each unit test for those students who were unable to take it at the scheduled time and can provide valid documentation. Scheduled rewrite sessions will be posted on LEARN; **please email the TA who will be administering the session (as indicated on LEARN) to confirm that you will be attending the rewrite session**. All students who missed the originally scheduled unit test are expected to attend the rewrite session. Exceptions will be granted only if additional documentation is provided covering the date of the rewrite session; decisions about how to proceed then will be made by the instructor on a case-by-case basis.

Tutorials

Each week in tutorial sessions, your TA will guide the group through solutions to a set of target exercises. These target exercises are drawn from unit tests given in previous years. The target exercises to be covered each week will be posted in advance. You will likely find the tutorials to be more helpful if you have attempted to solve the problems for yourself prior to each meeting. Although attending tutorials is optional, many students find the tutorials to be the most helpful feature of the course.

Sending Questions by E-mail

This is a large course, and as a result we typically receive lots of e-mail from students with questions about course content, assignments, unit tests and exams, etc. We are happy to receive questions by e-mail and will do our best to answer them promptly. To manage all this e-mail, however, we ask that whenever possible you direct your e-mail questions to your tutorial TA. The TA will either answer your question or forward it to the instructor as appropriate. For basic questions about the course content and scheduling, please be sure to read through the syllabus and announcements on LEARN before sending e-mail, as often the answers to questions we receive can be found there.

How to do well in this course

Here are some things you can do to more effectively learn the material and enjoy the course:
- carefully complete assigned readings each week *before* the lecture
- complete the "Learn by Doing" and "Did I Get This?" activities as you encounter them while doing the assigned reading in the online textbook
- test yourself on problems from the four problem sets, from the previous years' unit tests and from the example final exam (all downloadable from LEARN)
- ask questions, in lectures and tutorials, if you don't understand something
- see the instructor and/or your TAs during office hours if you need additional help
- See the Psychology Undergraduate website "Student Success" section "Psych 292 or Psych 391 – tips for success" (https://uwaterloo.ca/psychology/current-undergraduate-students/student-success#Psych292-391-Success)

If you find that you are having trouble with the material and need more help than a TA can provide during tutorial and office hours, you might consider getting help from a tutor. A list of students who recently took the class, did well, and have expressed a willingness to offer tutoring services (either for pay or on a voluntary basis) is available on the course LEARN site. It is left to you to contact and make arrangements directly with a tutor, and obviously it cannot be guaranteed that every student will benefit from tutoring, but working with a tutor may be a useful supplement to the course for those needing a little extra help.

Calculators

For the tutorial exercises, unit tests, and final exam, you will find it helpful to have a calculator, ideally with basic statistical functions (e.g., standard deviation). Please bring your calculator to every class meeting and every tutorial. For tests, students are not permitted to use smartphones or other internet-enabled devices instead of a calculator.

Attendance Policy

While highly recommended, lecture and tutorial attendance is not mandatory.

Course Outline

Lecture	Date	Lecture Topic	OLI module(s)	Covered on Test	Tutorial
1	Thursday, January 4	Displaying data, measures of center	4 (through measures of spread)	Test # 1	Tutorial # 1 Jan 9/10/11
2	Tuesday, January 9	Measures of spread	4 (from measures of spread)	Test # 1	Tutorial # 1 Jan 9/10/11
3	Thursday, January 11	probability	8	Test # 1	Tutorial # 2 Jan 16/17/18
4	Tuesday, January 16	Random variables	9 (Discrete Random Variables)	Test # 1	Tutorial # 2 Jan 16/17/18
5	Thursday, January 18	Normal distribution 1	9 (Continuous Random Variables)	Test # 2	Tutorial # 3 Jan 23/24/25
6	Tuesday, January 23	Normal Distribution 2	9 (Continuous Random Variables)	Test # 2	Tutorial # 4 Jan 30/31/Feb 1
Unit Test 1	Thursday, January 25				
7	Tuesday, January 30	Sampling Distributions 1: Expected Value (EV) and Standard Error (SE)	10	Test # 2	Tutorial # 4 Jan 30/31/Feb 1
8	Thursday, February 1	Sampling Distributions 2: Central Limit Theorem	10	Test # 2	Tutorial # 5 Feb 6/7/8
9	Tuesday, February 6	Confidence Intervals 1: population mean	11 and 12	Test # 2	Tutorial # 5 Feb 6/7/8
10	Thursday, February 8	Confidence Intervals 2: population proportion	11 and 12	Test # 2	Tutorial # 6 Feb 13/14/15
11	Tuesday, February 13	Hypothesis testing: one-sample tests	13 (Except type 1 and Type II errors)	Test # 3	Tutorial # 7 Feb 27/28/Mar 1
Unit Test 2	Thursday, February 15				
12	Tuesday, February 27	Hypothesis testing: related samples	14 (Matched Pairs)	Test # 3	Tutorial # 7 Feb 27/28/Mar 1
13	Thursday, March 1	Hypoth testing: independent samples	14 (Independent samples)	Test # 3	Tutorial # 8 Mar 6/7/8

Lecture	Date	Lecture Topic	OLI module(s)	Covered on Test	Tutorial
14	Tuesday, March 6	Hypothesis testing: effect size and power 1	13 (Type I and Type II Errors) and Power Module available online on the WISE website (http://wise1.cgu.edu/powermod)	Test # 3	Tutorial # 9 Mar 13/14/15
15	Thursday, March 8	Hypothesis testing: effect size and power 2	13 (Type I and Type II Errors) and Power Module available online on the WISE website (http://wise1.cgu.edu/powermod)	Test # 3	Tutorial # 9 Mar 13/14/16
16	Tuesday, March 13	correlation	5 (pp. 42 – 51)	As part of cumulative final	Tutorial # 10 Mar 20/21/22
17	Thursday, March 15	Regression 1	5 (pp. 52 – end) 12 (Case Q -> Q)	As part of cumulative final	Tutorial # 10 Mar 20/21/22
Unit Test 3	Tuesday, March 20				
18	Thursday, March 22	Regression 2	5 (pp. 52 – end) 15 (Case Q -> Q)	As part of cumulative final	Tutorial # 11 Mar 27/28/29
19	Tuesday, March 27	Chi-Square	5 (Case C -> C), 15 (Case C -> C)	As part of cumulative final	Tutorial # 11 Mar 27/28/29
20	Thursday, March 29	Test selection (review)	15 (Wrap-Up: Inference for Relationships)	As part of cumulative final	No Tutorial

Institutional-required statements for undergraduate course outlines

Academic Integrity

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. See the [UWaterloo Academic Integrity webpage](#) and the [Arts Academic Integrity webpage](#) for more information.

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to [Policy 71 - Student Discipline](#). For typical penalties check [Guidelines for the Assessment of Penalties](#).

Concerns About a Course Policy or Decision

Informal Stage. We in the Psychology Department take great pride in the high quality of our program and our instructors. Though infrequent, we know that students occasionally find themselves in situations of conflict with their instructors over course policies or grade assessments. If such a conflict arises, the Associate Chair for Undergraduate Affairs (Richard Eibach) is available for consultation and to mediate a resolution between the student and instructor: Email: reibach@uwaterloo.ca; Ph 519-888-4567 ext. 38790

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70 - Student Petitions and Grievances](#), Section 4. When in doubt, please be certain to contact Richard Eibach, the Associate Chair for Undergraduate Affairs who will provide further assistance; reibach@uwaterloo.ca.

Appeals: A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 - Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72 - Student Appeals](#).

Accommodation for Students with Disabilities

Note for students with disabilities: The [AccessAbility Services](#) office, located on the first floor of the Needles Hall extension (1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.

Accommodation for course requirements

- Students requesting accommodation for course requirements (assignments, midterm tests, final exams, etc.) due to illness should do the following:
  - Consult the University's examination regulations for information about procedures and policies for requesting accommodations
  - seek medical treatment as soon as possible
  - obtain documentation of the illness with a completed uWaterloo Verification of Illness Form
  - submit that form to the instructor within 48 hours. Students in Centre for Extended Learning (CEL) courses must submit their confirmation of the illness to CEL.
  - (if possible) inform the instructor by the due date for the course requirement that you will be unable to meet the deadline and that documentation will be forthcoming.
- In the case of a missed final exam, the instructor and student will negotiate an extension for the final exam, which will typically be written as soon as possible, but no later than the next offering of the course.
- In the case of a missed assignment deadline, midterm test, or quiz, the instructor will either:
  - waive the course component and re-weight remaining term work as he/she deems fit according to circumstances and the goals of the course, or
  - provide an extension.
- In the case of bereavement, the instructor will provide similar accommodations to those for illness. Appropriate documentation to support the request will be required.
- Students who are experiencing extenuating circumstances should also inform their academic advisors regarding their personal difficulties.
- Elective arrangements such as travel plans are not acceptable grounds for granting accommodations to course requirements per the uWaterloo Examination Regulations and Related Matters.

Official version of the course outline

If there is a discrepancy between the hard copy outline (i.e., if students were provided with a hard copy at the first class) and the outline posted on LEARN, the outline on LEARN will be deemed the official version. Outlines on LEARN may change as instructors develop a course, but they become final as of the first class meeting for the term.

Cross-listed course

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSYCH cross-list will count in the Philosophy major average, even if the course was taken under the Psychology rubric.

Mental Health Services

Mental Health Services aim is to provide holistic programming and services to help you lead a healthy and balanced life. We strive to provide a secure, supportive environment for students of all orientations and backgrounds.

Students suffering from problems with anxiety, depression, problems with sleep, attention, obsessions or compulsions, relationship difficulties, severe winter blues, etc., may make an appointment by phone or in person. Appointments are usually available within two days of initial contact with one of our medical doctors. All contacts are completely confidential.

Contact Health Services
[Health Services Building](#)
Call 519-888-4096 to schedule an appointment
Call 1-866-797-0000 for free 24/7 advice from a health professional

Contact Counselling Services
[Needles Hall Addition, NH 2401](#)
Call 519-888-4567 x 32655 to schedule an appointment
counserv@uwaterloo.ca

Territorial Acknowledgement

We acknowledge that we are living and working on the traditional territory of the Attawandaron (also known as Neutral), Anishinaabe and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes six miles on each side of the Grand River.