

University of Waterloo
Department of Psychology
PSYCH 391
Advanced Data Analysis
Fall 2019

Mondays & Wednesdays: 8:30am – 10:20am; AL113

Instructor and T.A. Information

Instructor: Harrison Oakes

Office: PAS 3250

Office Hours: **Mondays & Wednesdays, 10:30am – 11:30am**

Email: hoakes@uwaterloo.ca

Please include course code (PSYCH 391) in subject line.

Anonymous Feedback: LEARN > PSYCH 391 – Fall 2019 > Submit > Surveys > “Anonymous Survey”

T.A.	Karisa Parkington	Jessica Ross	Lydia Hicks
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Office	PAS 2241	PAS 3041	PAS 2257
Office Hours	Fri, 1pm – 2pm	Thurs, 1pm – 2pm	Thurs, 9:30am – 10:30am
Lab Section	101	102	103

T.A.	Austin Hurst	Michelle Ashburner
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Office	PAS 2245	PAS 4211
Office Hours	Tue, 1pm – 2pm	Wed, 5pm – 6pm
Lab Section	104	105

Territorial Acknowledgment

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.

Course Description

This course builds on the material covered in PSYCH 292. Topics that will be covered include: t-tests, power, ANOVA, factorial ANOVA, repeated measures, mixed designs, and multiple comparisons associated with those designs. The primary goal of the course is to provide students with a solid understanding of both the logic and computations underlying many of the statistical procedures that psychologists use when analyzing data collected from experiments. An additional goal for this course is that students will learn to perform these statistical analyses using SPSS.

Course Goals and Learning Outcomes

Upon completion of this course, students should be able to:

- A. Look at a large range of statistical problems, and be able to determine:
 - what the independent and dependent variables are
 - which statistical analyses would be appropriate
- B. Accurately conduct (by hand & using SPSS) the appropriate:
 - Power analysis for simple 2-level designs

- Descriptive and inferential statistics for simple 2-level and complex (multi-factorial) designs
- C. Report all analyses in APA format

Required Text

- Howell, D. C. (2017). Fundamental Statistics for the Behavioral Sciences (9th ed). Wadsworth.

Readings Available on LEARN

- I will provide a number of supplemental reading materials on LEARN

Course Information Available on LEARN

The course web page can be found on [LEARN](#). Here, you will find links to the syllabus, my lecture slides, homework and lab assignments, practice questions, and to important announcements. I will try my best to have the lecture slides for the upcoming lecture up at least 24 hours in advance of class time.

Course Requirements and Assessment

All tests and labs (see important dates below) will be based on material presented in the lectures and the lab tutorials.

Assessment	Date of Evaluation (if known)	Weighting
Homework Assignments	Ongoing	10%
Test #1	Wed, Oct 02	20%
Test #2	Mon, Nov 06	20%
Test #3	Final Exam Period	25%
Lab Assignment #1	Mon, Sept 30, 8:30am	5%
Lab Assignment #2	Mon, Nov 11, 8:30am	10%
Lab Assignment #3	Mon, Dec 03, 8:30am	10%
Research Participation	Ongoing	4%
Total		104%

Attendance/Participation

Attendance will not be graded, but is critical to doing well in this class. Lectures will be used to clarify concepts from the readings and to develop proficiency at using the logic and computations presented in the readings. Class participation will involve Kahoot! surveys and quizzes, and will require an electronic device that can connect to wifi. If you do not have access to an electronic device, please see me after the first class to make alternative arrangements.

STUDENTS ARE RESPONSIBLE FOR CATCHING UP ON MATERIAL THAT THEY MISSED WHILE ABSENT. I WILL ONLY PROVIDE ASSISTANCE CATCHING UP ON MATERIAL FOR ABSENCES WITH DOCUMENTATION.

Homework Assignments

Students will be assigned 11 weekly homework assignments, based on the week's assigned readings. These assignments are designed to develop students' understanding of the reading material. Students' grade on this component will be calculated from 10 of the 11 assignments, which means I will drop each student's lowest mark when calculating final grades on this component.

Homework assignments are due on Wednesdays, 8:30am, with the exception of Weeks 5 and 10, when they will be due on Monday, at 8:30am. This is to accommodate Tests 1 & 2, which will be held

on the Wednesday of those respective weeks. LATE HOMEWORK ASSIGNMENTS WILL NOT BE ACCEPTED AND WILL RECEIVE A GRADE OF 0%.

Homework assignments will be open book and completed through an online survey operated by Qualtrics™. When information is transmitted over the Internet, privacy cannot be guaranteed. There is always a risk your responses may be intercepted by a third party (e.g., government agencies, hackers). Qualtrics™ temporarily collects your computer Internet Protocol (IP) address to avoid duplicate responses in the dataset but will not collect information that could identify you personally. The only personal information collected from you will be your WatiAM ID (i.e., the beginning of your uwaterloo.ca email; e.g., hoakes from hoakes@uwaterloo.ca), which is public information. If you prefer not to submit your homework assignments through Qualtrics™, please speak to me after the first class to arrange to complete your homework assignments on paper.

Tests

In total, there will be three tests in this course. The content of the tests will be a combination of short answer and long answer, and will involve both conceptual and computational material.

Lab Assignments

There will be three lab assignments in this course. As with all work in this course, you are to complete the assignments on your own. It is important that you show all of your work for each assignment (i.e., all calculations). All assignments will be due at the start of class (i.e., 8:30am) and all late assignments will be penalized. For every class that an assignment is late, 25% will be deducted from your assignment grade. For example, if you received 100% on Lab Assignment #1 but handed it in one class late, you would receive 75% on the assignment.

Lab Tutorials

Each student should be registered in a lab section. Labs are intended to provide students with hands on experience with SPSS. For the most part, we will spend class time discussing the logic and rationale behind the statistical procedures covered in this course. The lab tutorial schedule is posted on page 6 of this syllabus.

NEXUS Accounts

Because you will be required to complete portions of your lab assignments with SPSS, it is important that you obtain a NEXUS account. A NEXUS account will give you access to e-mail, the internet, and a host of different software packages (including SPSS which you will need for the lab assignments). The only cost incurred with a NEXUS account is printing. You can purchase printing at PAS 1080 using your WATCARD. It is strongly recommended that you activate your NEXUS account, find the SPSS statistical package, and become familiar with it before the first lab. You can obtain a NEXUS account by: (a) going to a NEXUS computer (e.g., in PAS 1237), (b) clicking on the link in the bottom-left corner of the login browser, and (c) following the instructions as they are given on the screen.

Lab Assignments

There will be three lab assignments in this course. As with all work in this course, you are to complete the assignments on your own. It is important that you show all of your work for each assignment (i.e., all calculations). All assignments will be due at the start of class (i.e., 8:30am) and all late assignments will be penalized. For every class that an assignment is late, 25% will be deducted from your assignment

grade. For example, if you received 100% on Lab Assignment #1 but handed it in one class late, you would receive 75% on the assignment.

Research Participation

Experiential learning is considered an integral part of the undergraduate program in Psychology. Research participation is one example of this; article review is another. A number of undergraduate courses have been expanded to include opportunities for Psychology students to earn grades while gaining research experience.

Since experiential learning is highly valued in the Department of Psychology, students may earn a "bonus" grade of up to 4% in this course through research experience. Course work will make up 100% of the final mark and a "bonus" of up to 4% may be earned and will be added to the final grade if/as needed to bring your final grade up to 100%. The two options for earning research experience grades (participation in research and article review) are described below. Students may complete any combination of these options to earn research experience grades.

Option 1: Participation in Psychology Research:

Research participation is coordinated by the Research Experiences Group (REG). Psychology students may volunteer as research participants in lab and/or online (web-based) studies conducted by students and faculty in the Department of Psychology. Participation enables students to learn first-hand about psychology research and related concepts. Many students report that participation in research is both an educational and interesting experience. Please be assured that all Psychology studies have undergone prior ethics review and clearance through a University of Waterloo Research Ethics Committee.

Educational focus of participation in research:

To maximize the educational benefits of participating in research, students will receive feedback information following their participation in each study detailing the following elements:

- Purpose or objectives of the study
- Dependent and independent variables
- Expected results
- References for at least two related research articles
- Provisions to ensure confidentiality of data
- Contact information of the researcher should the student have further questions about the study
- Contact information for the Office of Research Ethics should the student wish to learn more about the general ethical issues surrounding research with human participants, or specific questions or concerns about the study in which s/he|they participated.

Participation in LAB studies is worth 0.5 participation credits (grade percentage points) for each 30-minutes of participation. Participation in ONLINE studies is worth .25 credits for each 15-minutes of participation. Researchers will record student's participation and will advise the course instructor of the total credits earned by each student at the end of the term.

How to participate?

Study scheduling, participation and grade assignment is managed using the SONA online system. All students enrolled in this course have been set up with a SONA account. You must get started early in the term.

[INSTRUCTIONS/DATES/DEADLINES: How to log in to Sona and sign up for studies](#)

**** Please do not ask the Course Instructor or REG Coordinator for information unless you have first thoroughly read the information provided on this website.****

More information about the REG program is available at: [REG Participants' Homepage](#)

Option 2

Students are not required to participate in research, and not all students wish to do so. As an alternative, students may opt to gain research experience by writing short reviews (1½ to 2 pages) of research articles (i.e., scientific journal articles) relevant to the course. You must contact your TA to get approval for the article you have chosen before writing the review. Each review article counts as one percentage point. To receive credit, you must follow specific guidelines. The article review must:

- **Be submitted before the last lecture. Late submissions will NOT be accepted under ANY circumstances.**
- Be typed
- Fully identify the title, author(s), source and date of the article. A copy of the article must be attached.
- Identify the statistical concepts in the article and critically evaluate the application or treatment of those concepts in the article. If inappropriate or incorrect, identify the error and its implications for the validity of the article. You may find, for example, misleading headings, faulty research procedures, alternative explanations that are ignored, failures to distinguish factual findings from opinions, faulty statements of cause-effect relations, errors in reasoning, etc. Provide examples whenever possible.
- Clearly evaluate the application or treatment of those concepts in the article.
- Keep a copy of your review in the unlikely event we misplace the original.

Final Examination Policy

For **Fall 2019**, the established examination period is **December 06-21, 2019**. The final exam schedule will be released on September 27, 2019. Students should be aware that student travel plans are not acceptable grounds for granting an alternative final examination time (see: [Final Examination Information](#)).

Lecture Schedule

Week	Date	Topic	Readings Due
1	Sept 04	Introduction to course	
2	Sept 09	Review of Basic Concepts	H: 1.2-1.3, 2.1-2.4, 3.1, 3.5, 4-4.4, 5-5.9, 6-6.3, 8-8.2
2	Sept 11	Hypothesis Testing, t Tests (HW1 Due)	H: 8.3-8.8, 12-12.5, 12.7, 13.2-13.6, 14.1-14.7
3	Sept 16	Power	H: 15
3	Sept 18	ANOVA (HW2 Due)	H: 16
4	Sept 23	ANOVA	H: 16

Week	Date	Topic	Readings Due
4	Sept 25	ANOVA (HW3 Due)	H: 16
5	Sept 30	ANOVA + Midterm Review (HW4 Due)	H: 16
5	Oct 02	Test #1	
6	Oct 07	Multiple Comparisons: Planned	Sup 1
6	Oct 09	Multiple Comparisons: Planned (HW5 Due)	Sup 1
7	Oct 14	NO CLASS (Thanksgiving Day)	
7	Oct 16	NO CLASS (Reading Week: Oct 15-18)	
8	Oct 21	Multiple Comparisons: Post-hoc	Sup 1
8	Oct 23	Multiple Comparisons: Post-hoc (HW6 Due)	Sup 1
9	Oct 28	Factorial ANOVA	H: 17
9	Oct 30	Factorial ANOVA (HW7 Due)	H: 17
10	Nov 04	Factorial ANOVA + Midterm Review (HW8 Due)	H: 17
10	Nov 06	Test #2	
11	Nov 11	Repeated Measures	H: 18, Sup 2
11	Nov 13	Repeated Measures (HW9 Due)	H: 18, Sup 2
12	Nov 18	Mixed Designs	Sup 2
12	Nov 20	Mixed Designs (HW10 Due)	Sup 2
13	Nov 25	Factorial Repeated Measures	Sup 2
13	Nov 27	Factorial Repeated Measures (HW11 Due)	Sup 2
14	Dec 03	Final Review	
December 03 LAST DAY OF CLASSES			

H: Refers to Howell's text, "Fundamental Statistics for the Behavioral Sciences."

Sup: Refers to two chapters from supplemental readings.

HW1-HW11: Refers to Homework Assignments #1 - #11.

Lab Tutorial Schedule

Week	Lab	Objective
1	NO LAB	
2	Lab 1	Reporting analyses in APA formatting
3	Lab 2	Intro to SPSS, t-tests (Handout L1)
4	Lab 3	One-way ANOVA
5	NO LAB	
6	Lab 4	Multiple Comparisons: Planned (L1 Due) (Handout L2)
7	NO LAB (Reading Week)	
8	Lab 5	Multiple Comparisons: Post-hoc
9	Lab 6	Factorial ANOVA with post-hocs
10	NO LAB	
11	Lab 7	Repeated Measures ANOVA with post hocs (L2 Due) (Hand out L3)
12	Lab 8	Mixed Factorial ANOVA with post hocs
13	Lab 9	Factorial Repeated Measures ANOVA
14	NO LAB (L3 due @ beginning of your usual lab session)	

L1-L3: Refers to Lab Assignments #1 - #3.

Late Work

Please note that all assignments are expected to be submitted on time. If you encounter circumstances that you feel may cause you to be late in submitting any particular assignment, you should contact me

immediately, explain the circumstances, and we may negotiate an extension. To do so, you must be in contact with me at least 24 hours prior to the deadline to request an extension. No last minute extensions will be granted.

All assignments will be due at the start of class (i.e., 8:30am). Please see the lecture schedule for exact dates. Late homework assignments will not be accepted. All late lab assignments will be penalized. For every class that a lab assignment is late, 25% will be deducted from your assignment grade. For example, if you received 100% on Lab Assignment #1 but handed it in one class late, you would receive 75% on the assignment. After four classes, late lab assignments will not be accepted for any reason except those outlined in the UW calendar (e.g., medical or family emergencies; some other such event) and will receive a grade of 0%. If an extension is granted, students are expected to submit their lab assignment at the agreed upon time and date, with the appropriate documentation. Please review the UW policy regarding accommodation for illness for unforeseen circumstances.

Electronic Device Policy

Electronic devices are allowed in class, provided they do not disturb teaching or learning. Please be courteous to your fellow students and only use your electronic devices for the purposes of engaging in course content (e.g., taking notes). Keep in mind that studies also show that pen-and-paper note-taking is more effective and leads to higher grades than laptop note taking. Electronic device use during lectures for email, Facebook, or other non-course related activities is not permitted.

Audio and video recordings of classroom lectures or activities must be approved by the professor prior to the beginning of the scheduled session. Recordings may only be used for individual study of materials presented during class and may not be published or distributed without the consent of the professor. Videos that contain images of other students may not be published or distributed without the consent of all students depicted in the video.

Accommodation for Illness or Unforeseen Circumstances:

The instructor follows the practices of the University of Waterloo in accommodating students who have documented reasons for missing quizzes or exams. See [Accommodation Policies](#).

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 [Office of 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. Check [the Office of Academic Integrity](#) for more information. 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](#).

Students should also be aware that copyright laws in Canada prohibit reproducing more than 10% of any work without permission from its author, publisher, or other copyright holder. Waterloo's policy on Fair Dealing is available here: [Fair Dealing policy](#). Violation of Canada's Copyright Act is a punishable academic offence under Policy 71 – Student Discipline.

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](#).

Note for Students with Disabilities

The [AccessAbility Services](#) office, located on the first floor of the Needles Hall extension (NH 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 for Psychology courses.

Policies of the Psychology department pertaining to course requirements are available on the [department website](#).

Mental Health Services

Mental Health Services aims 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.

On Campus

- [Counselling Services](#): Needles Hall Addition, NH 2401. Email: counselling.services@uwaterloo.ca or call 519-888-4567 ext. 32655

- [MATES](#): One-to-one peer support program offered by Federation of Students (FEDS) and Counselling Services
- [Health Services](#) Emergency service. Health Services Building, Located across the creek from Student Life Centre; Call 519-888-4096 to schedule an appointment; Call 1-866-797-0000 for free 24/7 advice from a health professional.
- [Campus Wellness](#): Central resource for primary medical care and mental health services.

Off campus, 24/7

- [Good2Talk](#): Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- [Grand River Hospital](#): Emergency care for mental health crisis. Phone: 519-749-433 ext. 6880
- [Here 24/7](#): Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- [OK2BME](#): set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 ext. 213

Full details can be found online at the Faculty of ARTS [website](#).

Download [UWaterloo and regional mental health resources \(PDF\)](#).

Download the [WatSafe app](#) to your phone to quickly access mental health support information.

A respectful living and learning environment for all

1. It is expected that everyone in this class will contribute to an environment of tolerance and respect by treating others with sensitivity and civility.
2. Harassment is unwanted attention in the form of jokes, insults, gestures, gossip, or other behaviours that are meant to intimidate. Some instances of harassment are against the law in addition to University of Waterloo policy.
3. Discrimination is treating people differently because of their race, disability, sex, sexual orientation, ancestry, colour, age, creed, marital status, or other personal characteristics. The Ontario Human Rights Code considers actions and behaviours rather than intentions.