

**University of Waterloo**  
**Department of Psychology**  
**PSYCH 391**  
**Advanced Data Analysis**  
**Winter 2019**  
**10:30-12:20, M/W, HH 139**

**Instructor and T.A. Information**

Instructor: James Beck  
Office: PAS 4028  
Office Phone: 519-888-4567 x33945  
Office Hours: Weds 3:00-4:00 PM or by appointment  
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Office Hours Fri 1:00-2:00 PM

**Course Description**

This course builds from the material covered in Psychology 292. Topics that will be covered include: t-tests, power, ANOVA, factorial ANOVA, repeated measures and 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.

**Recommended Text**

- Howell, D. C. (2014). Fundamental Statistics for the Behavioral Sciences. Thomson.

**Readings Available on LEARN**

- Multiple comparisons (Supplemental Reading #1)
- Repeated Measures ANOVA (Supplemental Reading #2)

**Course Requirements and Assessment**

<i>Assessment</i>	<i>Date of Evaluation (if known)</i>	<i>Weighting</i>
Exam 1	February 4, 2019	25%
Homework 1	February 4, 2019	5%
Exam 2	March 11, 2019	25%
Homework 2	March 11, 2019	10%
Exam 3	Final Exam Period - TBD	25%
Homework 3	April 3, 2019	10%
Total		100%

**Tests (75%):**

In total, there will be three tests in this course. The dates for these tests can be found on the course outline. The content of the tests will be a combination of short answer and long answer, and will involve both conceptual and computational material.

**Homework Assignments (25%):**

There will be three homework assignments in this course. The first homework assignment will be worth 5%, and the remaining two will be worth 10% of your final grade each. 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.

H = Howell. Sup = Supplemental reading.

Week	Date	Day	Topic	Reading
1	07-Jan	Mon	Course introduction	
1	09-Jan	Weds	Review of basics	H1, H2, H4, H5, H6, H8
2	14-Jan	Mon	Hypothesis testing	H12, H13, H14
2	16-Jan	Weds	T-tests	H12, H13, H14
3	21-Jan	Mon	Power, effect sizes	H15
3	23-Jan	Weds	ANOVA	H16
4	28-Jan	Mon	ANOVA	H16
4	30-Jan	Weds	Review day	
5	04-Feb	Mon	<b>Midterm Exam 1</b>	
5	06-Feb	Weds	Post hoc comparisons	H16, Sup 1
6	11-Feb	Mon	Post hoc comparisons	H16, Sup 1
6	13-Feb	Weds	Planned comparisons	H16, Sup 1
			Reading Week	
7	25-Feb	Mon	Planned comparisons	H16, Sup 1
7	27-Feb	Weds	Factorial ANOVA	H17
8	04-Mar	Mon	Factorial ANOVA	H17
8	06-Mar	Weds	Review day	
9	11-Mar	Mon	<b>Midterm Exam 2</b>	
9	13-Mar	Weds	Repeated measures	H18, Sup 2
10	18-Mar	Mon	Repeated measures	H18, Sup 2
10	20-Mar	Weds	Mixed designs	Sup 2
11	25-Mar	Mon	Mixed designs	Sup 2
11	27-Mar	Weds	Mixed designs	Sup 2
12	01-Apr	Mon	Review day	Sup 2
12	03-Apr	Weds	No Class	

## TENTATIVE LAB SCHEDULE

11:30-12:50, F, PAS 1237

Week	Date	Day	Topic
2	Jan 18	F	Intro to SPSS, T-tests
4	Feb 1	F	One-way ANOVA
6	Feb 15	F	Multiple Comparisons Pt. 1
7	Feb 22	F	NO LAB – READING WEEK
8	Mar 1	F	Multiple Comparisons Pt. 2
10	Mar 15	F	Factorial ANOVA
11	Mar 22	F	Repeated Measures ANOVA
12	Mar 29	F	Mixed Factorial ANOVA

### Late work and missed exams:

*In general I do **not** accept late work.* Under certain circumstances exceptions can be made:

- Documentation of illness or other circumstances leading to missing the deadline (e.g., bereavement).
- Contact instructor within 48 hours. Whenever possible, contact should be made **before the deadline** has passed.
- 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.

### **Information on Plagiarism Detection**

*Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. This is being done to verify that use of all material and sources in assignments is documented. Students will be given an option if they do not want to have their assignment screened by Turnitin®. In the first week of the term, details will be provided about arrangements and alternatives for the use of Turnitin® in this course.*

### **Electronic Device Policy**

Please do not record lectures without permission.

### **Attendance Policy**

I do not take attendance.

### **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](#).

## **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](#).*

## **Sona and Research Experience Marks Information and Guidelines**

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 been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee.

#### ***How to earn extra marks for your Psychology course(s) this term by participating in studies ...***

- You will earn "credits" which will be converted to "marks" (1 credit = 1%)
- You can schedule your LAB and/or ONLINE studies using the "Sona" website.
- UP TO 50% of your credits can be earned through ONLINE studies. The remaining need to be earned through in-lab participation.

#### ***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 Director of 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 participated.

Participation in LAB studies has increment values of 0.5 participation credits (grade percentage points) for each 30-minutes of participation. Participation in ONLINE studies has increment values of .25 credits for each 15-minutes of participation. Researchers will record student's participation, and at the end of the term the REG Coordinator will provide the course instructor with a credit report of the total credits earned by each student.

### ***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.

[Participating/SONA information: 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 in general is available at:

[REG Participants' Homepage](#) or you can check the [Sona FAQ](#) for additional information.

### **Option 2: Article Review as an alternative to participation in research**

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 relevant to the course. The course instructor will specify a suitable source of articles for this course (i.e., scientific journals, newspapers, magazines, other printed media). *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 day of lectures](#). 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 psychological concepts in the article and indicate the pages in the textbook that are applicable. 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.