

# Psychology 391 Advanced Data Analysis Winter 2017

**\*UPDATED December 8<sup>th</sup>, 2016\***

**Class Time:** Monday and Wednesday 2:30 - 4:20  
**Place:** AL 124  
**Instructor:** James Beck  
**Office:** PAS 4028  
**Office Hours:** Monday 11:30 - 12:30, or by appointment  
**Phone:** 519-888-4567 x33945  
**Email:** [james.beck@uwaterloo.ca](mailto:james.beck@uwaterloo.ca)  
**Course Website:** <https://sites.google.com/site/psych391/>

## **Teaching Assistant:**

Hanna Negami  
Office: PAS 2035  
Office Hour: Tuesday 1:00-2:00 or by appointment  
Email: [hnegami@uwaterloo.ca](mailto:hnegami@uwaterloo.ca)  
Lab: 101 (Thursday 3:00 – 3:50, PAS 1237)

## **\*Optional\* Text:**



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

\*I will also provide a number of supplemental reading materials on the course website\*

## **Course Objectives:**

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.

## **Course Requirements:**

<b>Requirement</b>	<b>Date</b>	<b>Value</b>
Test #1	February 1, 2017	25%
Test #2	March 8, 2017	25%
Test #3	Final Exam Period	25%
Graded Lab Assignments (N=3)	Feb 1 (5%), Mar 8 (10%) and Apr 3 (10%)	25%
Research Participation (or assignment)		4%

**TENTATIVE LECTURE SCHEDULE**

Week	Date	Day	Topic	Reading	Assignment
1	January 4, 2017	Wed	Course introduction		
2	January 9, 2017	Mon	Review of basics	H1, H2, H4, H5, H6, H8	
2	January 11, 2017	Wed	Hypothesis testing	H12, H13, H14	L1 handed out
3	January 16, 2017	Mon	T-tests	H12, H13, H14	
3	January 18, 2017	Wed	Power, effect sizes	H15	
4	January 23, 2017	Mon	ANOVA	H16	
4	January 25, 2017	Wed	ANOVA	H16	
5	January 30, 2017	Mon	Review day		
5	February 1, 2017	Wed	<b>Midterm Exam 1</b>		<b>L1 due</b>
6	February 6, 2017	Mon	Post hoc comparisons	H16, Sup 1	L2 handed out
6	February 8, 2017	Wed	Post hoc comparisons	H16, Sup 1	
7	February 13, 2017	Mon	Planned comparisons	H16, Sup 1	
7	February 15, 2017	Wed	Planned comparisons	H16, Sup 1	
	February 20, 2017	Mon	Reading Week		
	February 22, 2017	Wed			
8	February 27, 2017	Mon	Factorial ANOVA	H17	
8	March 1, 2017	Wed	Factorial ANOVA	H17	
9	March 6, 2017	Mon	Review day		
9	March 8, 2017	Wed	<b>Midterm Exam 2</b>		<b>L2 due</b>
10	March 13, 2017	Mon	Repeated measures	H18, Sup 2	L3 handed out
10	March 15, 2017	Wed	Repeated measures	H18, Sup 2	
11	March 20, 2017	Mon	Mixed designs	Sup 2	
11	March 22, 2017	Wed	Mixed designs	Sup 2	
12	March 27, 2017	Mon	Factorial repeated measures	Sup 2	
12	March 29, 2017	Wed	Factorial repeated measures	Sup 2	
13	April 3, 2017	Mon	Review day		<b>L3 due</b>

**H** - Refers to the Howell (2014) text entitled “*Fundamental Statistics for the Behavioral Sciences*”

**Sup** - Refers to two chapters from supplemental readings.

**L1-L3**: Refers to the three lab assignments

**TENTATIVE LAB SCHEDULE**

Week	Date	Day	Topic
2	January 12, 2017	Thurs	Intro to SPSS, T-tests
4	January 26, 2017	Thurs	One-way ANOVA
6	February 9, 2017	Thurs	Multiple Comparisons Pt. 1
7	February 16, 2017	Thurs	Multiple Comparisons Pt. 2
8	March 2, 2017	Thurs	Factorial ANOVA
10	March 16, 2017	Thurs	Repeated Measures ANOVA
11	March 23, 2017	Thurs	Mixed Factorial ANOVA
12	March 30, 2017	Thurs	Factorial Repeated Measures ANOVA

### **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.

### **Lab Assignments (25%):**

There will be three lab assignments in this course. The first lab 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.

### **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.

### **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 schedule is posted on page 2 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., one located 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.

### **Helpful suggestions to ensure your success in this (or any) class:**

1. Read the chapter before coming to class.
2. Look over the lecture notes before coming to class.
3. Take additional notes to supplement the class notes that are provided (note: I often supplement the text and class note materials with examples that will only be provided during lectures).
4. If you have questions, please ask.
5. Be aware of the due dates.
6. After a chapter has been covered, see if you can complete the exercises at the end of the chapters.
7. Come by and visit one of the TA's or me during office hours if you are having any difficulties with the material.

#### **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 undergone prior ethics review and clearance through the Office of Research Ethics.

#### ***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 is available at:

[REG Participants' Homepage](#)

### **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.

**The following statements and links should be included on all Psychology 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.

**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](#).

**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.

**Appeals:** A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read [Policy 72 - Student Appeals](#).

**Other sources of information for students:**

[Academic Integrity website \(Arts\)](#)

[Academic Integrity Office \(UWaterloo\)](#)

**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.

**Concerns About the Course or Instructor (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 Studies (Richard Eibach from July 1, 2015 through June 30, 2016) is available for consultation and to mediate a resolution between the student and instructor. Contact information:

Richard Eibach Email: [reibach@uwaterloo.ca](mailto:reibach@uwaterloo.ca); Ph 519-888-4567 ext. 38790

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. See [Policy 70](#) and [71](#) below for further details.

**Students requesting accommodation for course requirements (assignments, midterm tests, final exams, etc.) due to illness should do the following:**

- seek medical treatment as soon as possible and obtain a completed uWaterloo [Verification of Illness Form](#)
- submit that form to the instructor within 48 hours.
- (is 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:

1. 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
2. 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.

### **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 (Note: only need to include this if your course is cross-listed)**

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.

### **Intellectual Property.**

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).