
	<p>Psychology 391</p> <p>Advanced Data Analysis</p> <p>Fall, 2009</p>	
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UPDATED SEPTEMBER 14th 2009

Class Time: Mondays & Wednesdays 2:30 - 3:50
Place: AL 113
Instructor: Jonathan Fugelsang
Office: PAS 4055
Office Hours: Monday & Wednesday 4:30 - 5:30, and by appointment.
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Teaching Assistants:

Omid Fotuhi
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Tutorial: 102 (Wednesday 5:30 - 6:20)


Nadia Martin
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Tutorial: 101 (Wednesday 4:30 - 5:20)

Jason Ozubko
Office: PAS 4042
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Tutorial: 103 (Thursday 8:30 - 9:20)

Scott Shafer
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Tutorial: 103 (Thursday 8:30 - 9:20)

Karina Schumann
Office: PAS 3266
Office Hour: Tuesday 12:00-1:00
Email: kschuman@uwaterloo.ca
Tutorial: 104 (Thursday 5:30 - 6:20)

Text:

	<p>Howell, D. C. (2008). <i>Fundamental Statistics for the Behavioral Sciences</i>. Thomson.</p>
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Course Objectives:

This course builds from the material covered in Psychology 292. Topics that will be covered include: 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 advanced 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:

Requirement	Date	Value
Test #1	October 14th	25%
Test #2	November 11 th	25%
Test #3	Final Exam Period	25%
Graded Labs (N=3)	October 7 th (5%), November 9 th (10%) and December 2 nd (10%)	25%
Research Participation (or assignment)		4%

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.

Labs (15%):

There will be three lab assignments in this course. The first lab 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 and all late assignments will be penalized. Any assignments handed in after the start of the class in which it is due will be penalized as if it was one class late. For every class that an assignment is late, 25% will be deducted from your assignment grade. For example, if you received 100% on assignment 1 but handed it in one class late you would receive 75% on the assignment.

Research Participation (4%):

Experiential learning is considered an integral part of the undergraduate program in Psychology. Participation in research is one example of this. A number of undergraduate courses have been expanded to include opportunities for Psychology students to volunteer as research participants enabling them to learn first-hand about psychology research and related concepts. Many students report that participation in research is both an educational and interesting experience. Since experiential learning is highly valued in the Department of Psychology, student participants may earn a "bonus" grade of up to 4% in this course through research experience (i.e., **the maximum possible final grade is 104%**). This can be done in two ways. First, you may participate in studies conducted by students and faculty in the Department of Psychology. Participation is worth 0.5 participation credits (percentage points) for each half-hour of participation. Researchers will record student's participation and the REG Coordinator will advise the course instructor of the total credits earned by each student at the end of the term. Second, if you do not wish to participate in research, you may choose an alternative approach to earning the same number of credits; this is explained below in "Alternative to participating in research." Please note 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 sh/he participated.

How to sign up for studies:

Once you are registered in this course, you will get an account on Sona (our web-based Study Sign-Up system) at <http://uwaterloo.sona-systems.com> and you will receive an email with your UserID and Password. IF YOU DO NOT RECEIVE this email, please report this to regadmin@uwaterloo.ca immediately. .

- 1) **Log On to Sona:** User ID is your Quest ID (eg. j2smith)
 Password is your Student ID (eg 2001234)
- 2) **Human Subjects/Privacy Policy:** Please Read/Acknowledge
- 3) **Prescreen Questionnaire:** Please take 10 minutes to provide this demographics information. There is no credit for this and you may decline if you wish however completing it will increase your eligibility for studies.
- 4) **Sign-up for Online Surveys and/or Lab studies:**
 - a. Go to "Studies" page to view the list of available studies.
 - b. Click on the Titles of studies that are eligible for this course.
 - c. Read the Study Information page.
 - d. For Online studies: Click on "View Timeslots" and/or "Participate".
 - e. For Lab studies: Click on "View Timeslots" to set up lab appointments.

- 5) **Feedback and Credits:** Upon completion of the study you will receive feedback about the study hypothesis, design and predictions. Within 48 hours you will be granted the credit. Credits will be converted to grades and added to your final grade at the end of the term.

Mass Testing Survey (for 1.0 participation credit):

Researchers often select participants based on their responses to the measures in this survey. Completing it increases your eligibility for other studies. Note that you can only do this survey if you have completed the Prescreen questionnaire. Doing both Prescreen Questionnaire and Mass Testing Survey helps you (by providing more qualifying studies) and it helps researchers (by identifying more qualified participants). The Mass Testing Survey will be available until Tuesday October 20 at which time it will go offline, so please try to complete it before that date.

Study Restrictions and Important Dates:

- i) The first day to start participating in studies is Tuesday September 14.
- ii) The study must be eligible for a credit in this course (as noted in the Eligibility Requirements column on your Studies page).
- iii) **Only 2 of your credits for this course** can be for **Online** studies.
- iv) You should try to spread your participation out over the term i.e., if you wait until late in the term there may not be enough studies available for you.
- v) The last day to participate for **credit** is Friday December 4.
- vi) The last day to participate for **remuneration/pay** is Tuesday December 22.

Denial of access to studies: Completing studies that you have signed up for!

It is very important that you complete the studies that you have signed up for. For Lab studies this means showing up for the scheduled appointment. For Online studies this means completing the survey before the deadline that is posted in the timeslot. Please note that a study sign-up is a firm commitment to the researcher running the study so if you cannot keep the lab appointment or complete the survey before the deadline, please cancel the Sign-Up or contact the researcher in advance. Failure to attend 3 (THREE) Lab and/or Online studies that you have signed up for without providing adequate prior notice to the researcher may result in denial of access to further studies. Details are provided on the FAQ page on your Sona account.

For information, instructions, help with login problems etc. please contact:

REG website: <http://www.arts.uwaterloo.ca/~regadmin/regparticipant>

REG Coordinator: regadmin@uwaterloo.ca

Alternative to participating in research

Students are not required to participate in research, and not all students wish to do so. As an alternative to participation in research, students may submit short reviews (1½ to 2 pages) of journal articles relevant to statistics. Each review article counts as one percentage point. You should contact your instructor to get approval before writing the review. To receive credit, you must follow specific guidelines. The article review must:

- **Be submitted before December 4. 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. Critically 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.

Students may complete any combination of a) participation in research or b) article review up to a total of 4 credits (i.e., 4% grade).

Tutorials:

Each student should be registered in a tutorial section. Tutorials are intended to provide students with an opportunity to work through the mechanics of the statistical procedures with a TA in a smaller group setting, as well as give 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 tentative tutorial schedule is posted on page 5 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. 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.

Note for students with disabilities:

The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, 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 OPD at the beginning of each academic term.

Please be aware of the following university policies:

Academic Integrity: in order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility.

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, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (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, <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>

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, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>

TENTATIVE LECTURE SCHEDULE

Days	Topic	Readings	Tutorials
Sept 14	Introduction to course		
Sept 16	Review of Basic Concepts	Chap: H 1, 2, 4, 5, 6, 8	
Sept 21	Hypothesis Testing, T-tests (Handout L1)	Chap: H 12-14	Tut1 (wed, thur)
Sept 23	ANOVA	Chap: H 16	
Sept 28	ANOVA	Chap: H 16	Tut2 (wed, thur)
Sept 30	ANOVA	Chap: H 16	
Oct 5	ANOVA	Chap: H 16	
Oct 7	ANOVA & Mid-term Review (L1 Due)		
Oct 12	No Class: Thanksgiving Day		
Oct 14	<u>Test # 1</u>		
Oct 19	Multiple Comparisons: Background (Handout L2)	Chap: Sup 1	Tut3 (wed, thur)
Oct 21	Multiple Comparisons: Planned comp	Chap: Sup 1	
Oct 26	Multiple Comparisons: Post Hoc	Chap: Sup 1	Tut4 (wed, thur)
Oct 28	Multiple Comparisons: Post Hoc	Chap: Sup 1	
Nov 2	Factorial ANOVA	Chap: H 17	Tut5 (wed, thur)
Nov 4	Factorial ANOVA	Chap: H 17	
Nov 9	Factorial ANOVA & Midterm Review (L2 due)		
Nov 11	<u>Test #2</u>		
Nov 16	Repeated Measures (Handout L3)	Chap: H 18, Sup 2	Tut6 (wed, thur)
Nov 18	Repeated Measures	Chap: H 18, Sup 2	
Nov 23	Mixed Designs	Sup 2	Tut7 (wed, thur)
Nov 25	Mixed Designs	Sup 2	
Nov 30	Mixed Designs & Factorial Repeated Measures	Sup 2	Tut8 (wed, thur)
Dec 2	Factorial Repeated Measures (L3 due)	Sup 2	
Dec 5	Final Review Day	Sup 2	

H - Refers to the Howell (2008) 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 TUTORIAL/REVIEW SCHEDULE

Tutorial #	Date	Objective
No Tutorial	Week of Sept 14 th	----
Tutorial 1	Week of Sept 21 st	t-tests
Tutorial 2	Week of Sept 28 th	One-way ANOVA
No Tutorial	Week of Oct 5 th	----
Review Session	Tues October 13 th	Available for questions on Tuesday before Test #1 (location TBA, 9-5)
No Tutorial	Week of Oct 12 th	----
Tutorial 3	Week of Oct 19 th	Multiple Comparisons: A Priori
Tutorial 4	Week of Oct 26 th	Multiple Comparisons: Post Hoc
Tutorial 5	Week of Nov 2 nd	Factorial ANOVA with post hocs
Review Session	Tues Nov 10 th	Available for questions on Friday before Test #2 (location TBA, 9-5)
No Tutorial	Week of Nov 9 th	----
Tutorial 6	Week of Nov 16 th	Repeated Measures ANOVA with post hocs
Tutorial 7	Week of Nov 23 rd	Mixed Factorial ANOVA with post hocs
Tutorial 8	Week of Nov 30 th	Factorial Repeated Measures ANOVA with post hocs
Review Session	TBA	Available for questions on day before Test #3 (location TBA, 9-5)

