

---

<b>PSYC 312</b>	<b>Experimental Design and Quantitative Research Methods in Psychology</b>	<b>F16/W17</b>
-----------------	--	----------------

<b>Instructor:</b>	Dr. Melissa Boyce	<b>Lecture Location:</b>	ICT 102
<b>Phone:</b>	403-210-6257	<b>Lecture Days/Time:</b>	TR 2:00 – 3:15pm
<b>Email:</b>	mboyce@ucalgary.ca		
<b>Office:</b>	A258		
<b>Office Hours:</b>	TBA		

---

Contact your course instructor regarding general course issues, questions about lecture material and course content, and grading of exams. Contact your lab instructor regarding lab material, assignments, or the final paper.

### Course Description

This course aims to help you to develop the skills required to (a) conduct and analyze scientific research in psychology, (b) communicate your research to others, and (c) evaluate research by other psychologists. These skills are central to success as a psychology major\* (not to mention as a research psychologist). At a more general level, this course is designed to help you develop methodological, analytical, and communication skills that are invaluable in a wide range of everyday applications and in numerous lines of work.

*\*A final grade of at least an A- is required in this course or in an advanced research methods and statistics course (PSYC 407, PSYC 411, PSYC 417) in order to be admitted to the honours program in psychology.\**

Note: This course focuses on quantitative approaches. Students interested in qualitative psychological research should consider Psyc 415 - *Qualitative Inquiry in Psychology* upon completion of this course.

The laboratory component of the course is designed to facilitate experiential learning (learning by doing) of the material, and hence the lab assignments are integrated with the lecture schedule.

### Course Learning Outcomes

The Department of Psychology is committed to student knowledge and skill development. The table below lists the key learning outcomes for this course, the program-learning outcomes they facilitate (see [psyc.ucalgary.ca/undergraduate/program-learning-outcomes](http://psyc.ucalgary.ca/undergraduate/program-learning-outcomes)), and the expected level of achievement.

Course Learning Outcomes	PLO(s)	Level(s)
Describe the theoretical underpinnings of various statistical analyses and assumptions that must be met to conduct these statistical analyses	3	C
Accurately determine which statistical analysis is appropriate based on a study's research question and methodology and draw appropriate conclusions based on the results of a statistical analysis	2, 3, 4	C
Conduct statistical calculations by hand and using statistical software and	3	C

collect, organize, and manipulate data using statistical software		
Contrast various research methodologies for strengths and weaknesses.	2, 7	C
Describe and provide recommendations for how to deal with ethical issues in research	2, 6	I
Design a study to test a novel research question using an appropriate methodology	1, 2, 3, 4, 5, 6, 7	C
Create and orally present a poster to depict the results of an original study	3, 4, 5, 7	C
Write all elements of a laboratory report in APA format	3, 4, 5	C
Use PSYCINFO to locate primary research relevant to a specific topic	5	A
Critically evaluate research methodology and make recommendations for how to improve a research design.	2, 7	C
Critique all components of a published research paper.	2, 6, 7	I
Draw and interpret graphical depictions of data (single factor and factorial)	2, 3, 4	C

Notes. PLOs = Program-Learning Outcomes: 1 = demonstrate knowledge of psychological sciences, 2 = think critically and solve problems, 3 = conduct research and analyze data, 4 = communicate effectively, 5 = demonstrate information literacy, 6 = understand and implement ethical principles, 7 = apply psychological knowledge and skills. Level of PLO achievement facilitated by this course: I = introductory, C = competency, A = advanced.

### Prerequisites

Math 30 or 31 or Mathematics II and PSYC 200 – Principles of Psychology I

### Recommended Text

Howell, D. C. (2014). *Fundamental Statistics for the Behavioral Sciences (8th Ed.)*. Belmont, CA: Thomson Wadsworth.

It is also STRONGLY recommended that you obtain a copy of the *Publication Manual of the American Psychological Association (6th Ed.)* as you will be expected to conform to APA format in all assignments you submit.

Both books are available in the university bookstore.

### Evaluation

#### Class components (70% of final grade).

*Exams.* There will be six in-class exams during this course; all exams will be multiple-choice and will focus on lecture material. Exams' 1-5 will be worth 10% of your mark each (50% total) and will be non-cumulative insofar as they will be limited to material covered since the previous exam. However, many of the concepts in this course are inherently cumulative in that they assume knowledge and understanding of material introduced earlier. Exam 6 will be worth 20% of your mark and will be cumulative, covering all material taught in the course.

Exam dates and topics are as follows:

	Date	Topics
Exam 1	October 4, 2016	The Science of Psychology, The Role of Statistics in Research, Ethics, Research Ideas and

		Hypotheses, and Measuring and Manipulating Variables
Exam 2	November 15, 2016	Choosing the Best Measures, Non-Experimental Methods, Internal Validity, Alternative Research Designs, Plotting Data, Measures of Central Tendency, and Measures of Variability
Exam 3	December 8, 2016	Normal Distribution, z-Scores, Probability Theory, and Hypothesis Testing
Exam 4	February 7, 2017	The One Sample <i>t</i> -test, Confidence Limits on the Mean, Experiments with Two Groups: The <i>t</i> -test for Independent Samples and the Wilcoxon Rank Sum Test, Statistical Power, Single Factor Experiments with More than Two Groups: One-Way ANOVA, and Multiple Comparisons
Exam 5	March 14, 2017	Factorial Designs, Factorial ANOVA, Within-subjects Two Group Designs: Paired <i>t</i> -tests and Wilcoxon Signed Rank Test
Exam 6	April 11, 2017	All material in the course with an emphasis on material since Exam 5

**Lab components (30% of final grade).**

*Report.* An APA-formatted report based on a study to be conducted during lab. The final version, worth 10% of your mark, is due via your lab section's D2L Dropbox by 2pm on **Tuesday, April 4**. Instructions for completing your report will be posted on D2L and provided in lab.

*Labs.* Each student must be registered in a lab section associated with this lecture section. There will be ten lab assignments, which in total will comprise 20% of your grade. Lab assignments will be due in hard copy at the beginning of lab (due dates indicated on course schedule below). The grades allocated for each assignment are as follows:

Lab Assignment 1: Literature Search	2%
Lab Assignment 2: Observational Research	2%
Lab Assignment 3: Survey Research Parts 1 & 2	2%
Lab Assignment 4: Poster	2%
Lab Assignment 5: Independent Samples <i>t</i> -Tests	2%

Lab Assignment 6: Between-Subjects Factorial ANOVA	2%
Lab Assignment 7: Draft of Intro & Methods	2%
Lab Assignment 8: Paired t-Tests	2%
Lab Assignment 9: Repeated Measures ANOVA	2%
<u>Lab Assignment 10: Correlation and Regression</u>	<u>2%</u>
	Total 20%

**NOTE: There will be components of the labs that you are expected to complete in your own time. It is extremely important that you do this work prior to the allotted deadlines, as future labs will be based on the work that you do outside of the lab.**

It is expected that you will complete all components of the course. If you miss an exam without medical documentation, you will receive a score of 0 for that exam. Late lab assignments (including the final paper) will be deducted 5% per day (including weekends) up to a maximum of 35% (7 days), at which point, late assignments will no longer be accepted without medical documentation. All assignments must be submitted in hard copy at the beginning of lab.

**Students must achieve a passing grade on BOTH the class and lab components to pass this course.**

#### **Calculators & Formula Sheets**

For tests requiring computations, a non-graphics based calculator may be used. For some tests, formula information will be provided at the time of the test. No other resources (textbook, notes) are allowed during tests.

#### **Department of Psychology Grade Distribution Policy**

The distribution of grades in Psychology courses (the percentage of A grades, B grades, etc.) will be similar to the distribution of grades in other courses in the Faculty of Arts. The Department monitors the grade distributions of 200-, 300-, and 400-level courses in the Faculty to ensure that the grade distributions in Psychology courses are comparable. Based on these reviews, students can expect that 1) up to 30% of grades in 200- and 300-level psychology courses will be "A" grades (A+, A, and A-), and 2) up to 40% of grades 400-level psychology courses will be "A" grades.

#### **Department of Psychology Criteria for Letter Grades**

Psychology professors use the following criteria when assigning letter grades:

**A+ grade: *Exceptional Performance.*** An A+ grade indicates near perfect performance on multiple choice and short answer exams. For research papers/essays/course projects/presentations, an A+ grade is awarded for exceptional work deserving of special recognition and is therefore not a common grade.

**A, A- Range: *Excellent Performance.*** Superior understanding of course material. Written work is very strong in terms of critical and original thinking, content, organization, and the expression of ideas, and demonstrates student's thorough knowledge of subject matter.

**B Range: *Good Performance.*** Above average understanding of course material. Written work shows evidence of critical thinking and attention to organization and editing but could be improved in form and/or content.

C Range: *Satisfactory Performance*. Adequate understanding of course material. Knowledge of basic concepts and terminology is demonstrated. Written work is satisfactory and meets essential requirements but could be improved significantly in form and content. Note: All prerequisites for courses offered by the Faculty of Arts must be met with a minimum grade of C-.

D range: *Marginally meets standards*. Minimal understanding of subject matter. Written work is marginally acceptable and meets basic requirements but requires substantial improvements in form and content. Student has not mastered course material at a level sufficient for advancement into more senior courses in the same or related subjects.

F grade: *Course standards not met*. Inadequate understanding of subject matter. Written work does not meet basic requirements. Student has not demonstrated knowledge of course material at a level sufficient for course credit.

**Grading Scale**

A+	96-100%	B+	80-84%	C+	67-71%	D+	54-58%
A	90-95%	B	76-79%	C	63-66%	D	50-53%
A-	85-89%	B-	72-75%	C-	59-62%	F	0-49%

As stated in the University Calendar, it is at the instructor’s discretion to round off either upward or downward to determine a final grade when the average of term work and final examinations is between two letter grades. In this course there will be no rounding up of final grades, especially in light of the opportunities students have to increase their final grade via research participation.

**Tentative Lecture Schedule**

Week	Date	Lecture Topic	Relevant Text Material	Lab Topic	Lab Assignment Due
1	T Sep 13	Introduction to the course	Course Outline	No Lab	
	R Sep 15	The Science of Psychology	Ch. 1		
2	T Sep 20	The Role of Statistics in Research	Ch. 2	Literature Search	
	R Sep 22	Ethics			
	F Sep 23	<i>Last day to drop full courses (Multi-term) and Fall Term half courses. No refunds for full courses (Multi-</i>			

		<i>term) or Fall Term half courses after this date.</i>			
3	M Sep 26	<i>Last day to add or swap full courses (Multi-term) and Fall Term half courses. Last day for change of registration from audit to credit or credit to audit.</i>		Writing Research Papers in APA format and Plagiarism	Literature Search Assignment due beginning of lab
	T Sep 27	Research Ideas and Hypotheses			
	R Sep 29	Measuring and Manipulating Variables			
	F Sep 30	<i>Fee payment deadline for Fall Term full and half courses.</i>			
4	T Oct 4	<b>Exam 1</b>	<b>All material to date</b>	No Lab (due to Exam 1)	
	R Oct 6	Choosing the Best Measures			
5	T Oct 11	Non-Experimental Methods I		No Lab (due to Thanksgiving)	
	R Oct 13	Non-Experimental Methods II			
6	T Oct 18	Non-Experimental Methods III		Survey Research Part 1: Survey Development  <b>**MUST COMPLETE ONLINE SURVEY BY MONDAY, OCT 24 AT</b>	
	R Oct 20	Internal Validity			

				<b>10PM</b>	
7	T Oct 25	Alternative Research Designs		Observational Research	
	R Oct 27	Plotting Data	Ch. 3		
8	T Nov 1	Measures of Central Tendency	Ch. 4	Survey Research Part 2: Data Analysis	Observational Research Assignment due beginning of lab
	R Nov 3	Measures of Variability	Ch. 5		
9	T Nov 8	Review		No Lab (Due to Reading Days)	
	R Nov 10	<b>Reading Day. No lectures.</b>			
10	T Nov 15	<b>Exam 2</b>		No Lab (Due to Exam 2)	
	R Nov 17	The Normal Distribution	Ch. 6		
11	T Nov 22	Z-Scores		Putting together a Poster	Survey Research Assignment due beginning of lab
	R Nov 24	Probability Theory	Ch. 7		
12	T Nov 29	Hypothesis Testing I	Ch. 8	Poster Session	Poster due beginning of lab
	R	Hypothesis Testing II	Ch. 8		

	Dec 1				
13	T Dec 6	Review		No Lab (Due to Exam 3)	
	R Dec 8	<b>Exam 3</b>			
14	T Jan 10	The One Sample <i>t</i> -test	Ch. 12	No Lab (Due to beginning of term)	
	R Jan 12	Confidence Limits on the Mean			
15	T Jan 17	Experiments with Two Groups: The <i>t</i> -test for Independent Samples	Ch. 14	Participate in online study & outline of research paper	
	R Jan 19	Experiments with Two Groups: The Wilcoxon Rank Sum Test	Ch. 20		
16	T Jan 24	Statistical Power	Ch. 15	Independent Samples <i>t</i> -tests	
	R Jan 26	Single Factor Experiments with More Than Two Groups: One-Way Analysis of Variance (ANOVA)	Ch. 16		
17	T Jan 31	Multiple Comparison Procedures		Analyze Experiment and Research Paper Q&A	Independent Groups <i>t</i> -test Assignment due beginning of lab
	R Feb 2	Review			
18	T Feb 7	<b>Exam 4</b>		No Lab (due to Exam 4)	
	R Feb 9	Factorial Designs I	Ch. 17		
19	T Feb 14	Factorial Designs II		Factorial ANOVA	Draft of Introduction

	R Feb 16	Factorial ANOVA I	Ch. 17		and Method due beginning of lab
20	T Feb 21	Reading Week – No Lecture		No Lab (due to Reading Week)	
	R Feb 23	Reading Week – No Lecture			
21	T Feb 28	Factorial ANOVA II	Ch. 17	Paired <i>t</i> -tests	Factorial ANOVA Assignment due beginning of lab
	R Mar 2	Within-Subjects Two Group Designs: The Paired <i>t</i> -test	Ch. 13		
22	T Mar 7	Within-Subjects Two Group Designs: The Wilcoxon Signed Rank Test	Ch. 20	Repeated Measures ANOVA	Paired <i>t</i> -test Assignment due beginning of lab
	R Mar 9	Review			
23	T Mar 14	<b>Exam 5</b>		No Lab (due to Exam 5)	
	R Mar 16	Repeated Measures ANOVA	Ch. 18		
24	T Mar 21	Correlation	Ch. 9	Correlation and Regression Lab	Repeated Measures ANOVA Assignment due beginning of lab
	R Mar 23	Regression	Ch. 10		
25	T Mar	Practice with Correlation and		Critiquing	Correlation and

	28	Regression		Research Lab	Regression Assignment due beginning of lab
	R Mar 30	Multiple Regression	Ch. 11		
26	T Apr 4	Chi-Square	Ch. 19	Optional lab: Applying to Graduate School	<b>Research Paper due to D2L Dropbox by 2pm on Tues, April 4</b>
	R Apr 6	Review			
27	T Apr 11	<b>Exam 6</b>		No Lab (due to end of term)	
	W Apr 12	<i>Last day to participate in research and allocate research credits. Last day to withdraw from Winter Term courses and Fall/Winter Term (Multi-Term) courses.</i>			

### Reappraisal of Grades

A student who feels that a piece of graded term work (e.g., term paper, essay, test) has been unfairly graded, may have the work re-graded as follows. The student shall discuss the work with the instructor within 15 days of being notified about the mark or of the item's return to the class; no reappraisal of term work is permitted after the 15 days. If not satisfied, the student shall immediately take the matter to the Head of the department offering the course, who will arrange for a reassessment of the work within the next 15 days. The reappraisal of term work may cause the grade to be raised, lowered, or to remain the same. If the student is not satisfied with the decision and wishes to appeal, the student shall address a letter of appeal to the Dean of the faculty offering the course within 15 days of the unfavourable decision. In the letter, the student must clearly and fully state the decision being appealed, the grounds for appeal, and the remedies being sought, along with any special circumstances that warrant an appeal of the reappraisal. The student should include as much written documentation as possible.

### **Plagiarism and Other Academic Misconduct**

Intellectual honesty is the cornerstone of the development and acquisition of knowledge and requires that the contribution of others be acknowledged. Consequently, plagiarism or cheating on any assignment is regarded as an extremely serious academic offense. Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Students should examine sections of the University Calendar that present a Statement of Intellectual honesty and definitions and penalties associated with Plagiarism/Cheating/Other Academic Misconduct.

### **Academic Accommodation**

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services ; SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit [www.ucalgary.ca/access/](http://www.ucalgary.ca/access/).

Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor.

The full policy on Student Accommodations is available

at [http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy\\_0.pdf](http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy_0.pdf) .

Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. You are also required to discuss your needs with your instructor no later than 14 days after the start of this course.

### **Absence From A Test/Exam**

Makeup tests/exams are **NOT** an option without an official University medical excuse (see the University Calendar). A completed Physician/Counselor Statement will be required to confirm absence from a test/exam for health reasons; the student will be required to pay any cost associated with this Statement. Students who miss a test/exam have up to 48 hours to contact the instructor and to schedule a makeup test/exam. Students who do not schedule a makeup test/exam with the instructor within this 48-hour period forfeit the right to a makeup test/exam. At the instructor's discretion, a makeup test/exam may differ significantly (in form and/or content) from a regularly scheduled test/exam. Except in extenuating circumstances (documented by an official University medical excuse), a makeup test/exam must be written within 2 weeks of the missed test/exam during exam make-up hours provided by the department <http://psychology.ucalgary.ca/undergraduate/exam-and-course-information#mues>. If a student cannot write their final exam on the date assigned by the Registrar's Office, they need to apply for a deferred exam [http://www.ucalgary.ca/registrar/exams/deferred\\_final](http://www.ucalgary.ca/registrar/exams/deferred_final). Under no circumstances will this be accommodated by the department.

### **Travel During Exams**

Consistent with University regulations, students are expected to be available to write scheduled exams at any time during the official December and April examination periods. Requests to write a make-up exam because of conflicting travel plans (e.g., flight bookings) will NOT be considered by the department. Students are advised to wait until the final examination schedule is posted before making any travel arrangements. If a student cannot write their final exam on the date assigned by the Registrar's Office, they need to apply for a deferred exam [http://www.ucalgary.ca/registrar/exams/deferred\\_final](http://www.ucalgary.ca/registrar/exams/deferred_final). Under no circumstances will this be accommodated by the department.

### **Freedom of Information and Protection of Privacy (FOIP) Act**

The FOIP legislation disallows the practice of having student's retrieve tests and assignments from a public place. Therefore, tests and assignments may be returned to students during class/lab, or during office hours, or will be made available only for viewing during exam review sessions scheduled by the Department. Tests and assignments will be shredded after one year. Instructors should take care to not link students' names with their grades, UCIDs, or other FOIP-sensitive information.

### **Course Credits for Research Participation (Max 2% of final grade)**

Students in most psychology courses are eligible to participate in Departmentally-approved research and earn credits toward their final grades. A maximum of two credits (2%) per course, including this course, may be applied to an individual's final grade. **To get 2%** added to the final grade in a full-year course, like this one, you have to acquire **a total of 4 bonus credits** towards the course. These credits may be acquired in the Fall and/or the Winter Session. The demand for timeslots may exceed the supply in a given term. Thus, students are not guaranteed that there will be enough studies available to them to meet their credit requirements. Students should seek studies early in the term and should frequently check for open timeslots. Students can create an account and participate in Departmentally-approved research studies at <http://ucalgary.sona-systems.com>. The last day to participate in studies and to assign or reassign earned credits to courses is **Apr 12<sup>th</sup>, 2017**.

### **Evacuation Assembly Point**

In case of an emergency evacuation during class, students must gather at the designated assembly point nearest to the classroom. The list of assembly points is found at

<http://www.ucalgary.ca/emergencyplan/assemblypoints>

Please check this website and note the nearest assembly point for this course.

### **Student Organizations**

Psychology students may wish to join the Psychology Undergraduate Students' Association (PSYCHS). They are located in Administration 130 and may be contacted at 403-220-5567.

**Student Union VP Academic:** Phone: 403-220-3911 [suypaca@ucalgary.ca](mailto:suypaca@ucalgary.ca)

**Student Union Faculty Rep.:** [arts1@su.ucalgary.ca](mailto:arts1@su.ucalgary.ca)

### **Student Ombudsman's Office**

The Office of the Student Ombudsmen provides independent, impartial and confidential support for students who require assistance and advice in addressing issues and concerns related to their academic careers. The office can be reached at 403-220-6420 or [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca)

(<http://www.ucalgary.ca/provost/students/ombuds>)

### **Safewalk**

The safewalk program provides volunteers to walk students safely to their destination anywhere on campus. This service is free and available 24 hrs/day, 365 days a year.

Call 403-220-5333.

### **Important Dates**

The last day to drop this course with no "W" notation and **still receive a tuition fee refund is September 23, 2016**. Last day for registration/change of registration is **September 26, 2016**. The last day to withdraw from this course is **December 9, 2016**.