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<b>PSYC 312</b>	<b>Experimental Design and Quantitative Research Methods in Psychology</b>	<b>F17/W18</b>
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<b>Instructor:</b>	Dr. Melissa Boyce	<b>Lecture Location:</b>	ENA 201
<b>Phone:</b>	403-210-6257	<b>Lecture Days/Time:</b>	TR 3:30 – 4:45pm
<b>Email:</b>	mboyce@ucalgary.ca	<b>TA Info:</b>	See D2L
<b>Office:</b>	A258		
<b>Office Hours:</b>	TBA		

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Contact me 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.

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	Assessment Methods	PLO(s)	Level(s)
Identify the theoretical underpinnings of various statistical analyses and assumptions that must be met to conduct these statistical analyses	Multiple choice exams, lab assignments 5-10	3	C
Identify which statistical analysis is appropriate based on a study's research question and methodology	Multiple choice exams, lab assignments	2, 3, 4	C
Conduct and interpret statistical calculations by hand and using statistical software	Multiple choice exams, lab assignments, lab report	3	C

Contrast research methodologies for strengths and weaknesses.	Multiple choice exams	2, 7	C
Identify ethical issues in research	Multiple choice exams	2, 6	I
Design research using appropriate methodology to test a research question	Lab assignments	1, 2, 3, 4, 5, 6, 7	C
Effectively communicate research findings	Lab assignments, lab report	3, 4, 5, 7	C
Write all elements of a laboratory report in APA format	Lab assignments, lab report	3, 4, 5	C
Use PSYCINFO to locate primary research relevant to a specific topic	Lab assignments, lab report	5	A
Draw and interpret graphical depictions of data (single factor and factorial)	Multiple choice exams, lab assignments, lab report	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

PSYC 200 – Principles of Psychology I and one of: Mathematics 30-1, Mathematics 30-2, Pure Mathematics 30, Applied Mathematics 30, Mathematics 31. Mathematics II (offered by Continuing Education), or 50 per cent or higher on the Mathematics Diagnostic Test. Equivalents will be accepted for students from outside Alberta.

### 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.

### Assessment Methods

#### 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 3, 2017	The Science of Psychology, The Role of Statistics in Research, Ethics, Research Ideas and Hypotheses, and Measuring and Manipulating Variables
Exam 2	November 14, 2017	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 7, 2017	Normal Distribution, z-Scores, Probability Theory, and Hypothesis Testing
Exam 4	February 6, 2018	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 13, 2018	Factorial Designs, Factorial ANOVA, Within-subjects Two Group Designs: Paired <i>t</i> -tests and Wilcoxon Signed Rank Test
Exam 6	April 10, 2018	All material in the course with an emphasis on material since Exam 5

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

*Lab Report.* An APA-formatted report based on a study to be conducted during lab. The final version, worth 10% of your mark, is due at the **beginning of your lab the week of April 2-6**. Instructions for completing your report will be posted on D2L and provided in lab.

*Lab Assignments.* 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: ANOVA	2%
Lab Assignment 7: Draft of Intro & Method	2%
Lab Assignment 8: Paired <i>t</i> -Tests	2%
Lab Assignment 9: Repeated Measures ANOVA	2%
Lab Assignment 10: Correlation and Regression	2%
<hr/> 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.

Without medical documentation, 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. 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 are allowed during tests.

#### **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. To determine final letter grades, final percentage grades will be rounded up or down to the nearest whole percentage (e.g., 89.5% will be rounded up to 90% = A but 89.4% will be rounded down to 89% = A-).

### Tentative Lecture Schedule

Week	Date	Lecture Topic	Relevant Text Material	Lab Topic	Lab Assignment Due
1	T Sep 12	Introduction to the course	Course Outline	No Lab	
	R Sep 14	The Science of Psychology	Ch. 1		
2	T Sep 19	The Role of Statistics in Research	Ch. 2	Literature Search	
	R Sep 21	Ethics			
	F Sep 22	<i>Last day to drop full courses (Multi-term) and Fall Term half courses.</i>			

		<i>No refunds for full courses (Multi-term) or Fall Term half courses after this date.</i>			
3	M Sep 25	<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 26	Research Ideas and Hypotheses			
	R Sep 28	Measuring and Manipulating Variables			
	F Sep 29	<i>Fee payment deadline for Fall Term full and half courses.</i>			
4	T Oct 3	<b>Exam 1</b>	<b>All material to date</b>	No Lab (due to Exam 1)	
	R Oct 5	Choosing the Best Measures			
5	T Oct 10	Non-Experimental Methods I		No Lab (due to Thanksgiving)	
	R Oct 12	Non-Experimental Methods II			
6	T Oct 17	Non-Experimental Methods III		Survey Research Part 1: Survey Development  <b>**MUST COMPLETE ONLINE SURVEY BY MONDAY,</b>	
	R Oct 19	Non-Experimental Methods IV			

				<b>OCT 23 AT 10PM</b>	
7	T Oct 24	Internal Validity		Observational Research	
	R Oct 26	Alternative Research Designs			
8	T Oct 31	Plotting Data	Ch. 3	Survey Research Part 2: Data Analysis	Observational Research Assignment due beginning of lab
	R Nov 2	Measures of Central Tendency	Ch. 4		
9	T Nov 7	Measures of Variability	Ch. 5	No Lab (Due to Reading Days)	
	R Nov 9	Review			
10	T Nov 14	<b>Exam 2</b>		No Lab (Due to Exam 2)	
	R Nov 16	The Normal Distribution	Ch. 6		
11	T Nov 21	Z-Scores		Putting together a Poster	Survey Research Assignment due beginning of lab
	R Nov 23	Probability Theory	Ch. 7		
12	T Nov 28	Hypothesis Testing I	Ch. 8	Poster Session	Poster due beginning of lab

	R Nov 30	Hypothesis Testing II	Ch. 8		
13	T Dec 5	Review		No Lab (Due to Exam 3)	
	R Dec 7	<b>Exam 3</b>			
14	T Jan 9	The One Sample <i>t</i> -test	Ch. 12	No Lab (Due to beginning of term)	
	R Jan 11	Confidence Limits on the Mean			
15	T Jan 16	Experiments with Two Groups: The <i>t</i> -test for Independent Samples	Ch. 14	Participate in online study & outline of research paper	
	R Jan 18	Experiments with Two Groups: The Wilcoxon Rank Sum Test	Ch. 20		
16	T Jan 23	Statistical Power	Ch. 15	Independent Samples <i>t</i> -tests	
	R Jan 25	Single Factor Experiments with More Than Two Groups: One-Way Analysis of Variance (ANOVA)	Ch. 16		
17	T Jan 30	Multiple Comparison Procedures		Analyze Experiment and Research Paper Q&A	Independent Groups <i>t</i> -test Assignment due beginning of lab
	R Feb 1	Review			
18	T Feb 6	<b>Exam 4</b>		No Lab (due to Exam 4)	
	R Feb 8	Factorial Designs I	Ch. 17		

19	T Feb 13	Factorial Designs II		Factorial ANOVA	Draft of Introduction and Method due beginning of lab
	R Feb 15	Factorial ANOVA I	Ch. 17		
20	T Feb 20	Reading Week – No Lecture		No Lab (due to Reading Week)	
	R Feb 21	Reading Week – No Lecture			
21	T Feb 27	Factorial ANOVA II	Ch. 17	Paired t-tests	Factorial ANOVA Assignment due beginning of lab
	R Mar 1	Within-Subjects Two Group Designs: The Paired t-test	Ch. 13		
22	T Mar 6	Within-Subjects Two Group Designs: The Wilcoxon Signed Rank Test	Ch. 20	Repeated Measures ANOVA	Paired t-test Assignment due beginning of lab
	R Mar 8	Review			
23	T Mar 13	<b>Exam 5</b>		No Lab (due to Exam 5)	
	R Mar 15	Repeated Measures ANOVA	Ch. 18		
24	T Mar 20	Correlation	Ch. 9	Correlation and Regression Lab	Repeated Measures ANOVA Assignment due beginning of lab
	R Mar 22	Regression	Ch. 10		

25	T Mar 27	Practice with Correlation and Regression		No lab (due to Good Friday)	
	R Mar 29	Multiple Regression	Ch. 11		
26	T Apr 3	Chi-Square	Ch. 19	Applying to Graduate School and Career Options in Psychology	Correlation and Regression Assignment due beginning of lab  <b>Lab Report due at the beginning of lab</b>
	R Apr 5	Review			
27	T Apr 10	<b>Exam 6</b>		No Lab (due to end of term)	
	W Apr 11	<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 Accommodations**

The student accommodation policy can be found at: [ucalgary.ca/access/accommodations/policy](http://ucalgary.ca/access/accommodations/policy). Students needing an Accommodation because of a Disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities [ucalgary.ca/policies/files/policies/student-accommodation-policy](http://ucalgary.ca/policies/files/policies/student-accommodation-policy). Students needing an Accommodation based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the instructor.

### **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.

### **Acknowledgments and Respect for Diversity**

Our classrooms view diversity of identity as a strength and resource. Your experiences and different perspectives are encouraged and add to a rich learning environment that fosters critical thought through respectful discussion and inclusion. The Department of Psychology would also like to acknowledge the traditional territories of the people of the Treaty 7 region in southern Alberta. The City of Calgary is also home to Métis Nation of Alberta, Region III.

### **Campus Mental Health Strategy**

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, <https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy website (<http://www.ucalgary.ca/mentalhealth/>).

### **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 13<sup>th</sup>, 2018**.

### **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 [suwpaca@ucalgary.ca](mailto:suwpaca@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 22, 2017**. Last day for registration/change of registration is **September 25, 2017**. The last day to withdraw from this course is **December 8, 2017**.