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| **PSYC 411** | **Design and Analysis in Psychological Research** | **Fall 2020** |
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| **Instructor:** | Dr. Mark Holden | **Lecture Location:** | Online, delivered via D2L |
| **Phone:** | 403-210-9552 | **Lecture Postings:** | TR (asynchronous) |
| **Email:** | mark.holden@ucalgary.ca | **Lab Info:** | Days TBA (asynchronous) |
| **Office:** | Admin 214 | **TA Info:** | Alberto Umiltà |
| **Office Hours:** | Online, by appointment | | alberto.umilta@ucalgary.ca |

**Course Description**

This course builds on the foundation of Psyc 300/301 (Research Methods and Data Analysis in Psychology I and II) OR Psyc 312 (Experimental Design and Quantitative Research Methods in Psychology) by introducing students to numerous statistical methods and experimental design considerations that are frequently encountered in Psychological Research. The aim of this course is to provide students with an overview of different design considerations or methods that they are likely to encounter, whether through their own research or when evaluating research by other psychologists. These skills are useful for psychology majors, those considering graduate studies in psychology, or even those who simply wish to be better consumers of research.

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

Because this course seeks to introduce students to various statistical procedures, there is a laboratory component in which students will gain direct experience with these methods. This experiential learning (learning by doing) component of the course will therefore be integrated with the lecture material, as a way of reinforcing the concepts discussed in class.

**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 https://live-arts.ucalgary.ca/psychology/about#program-learning-outcomes), and the expected level of achievement.

| Course Learning Outcomes | Assessment Methods | PLO(s) | Level(s) |
|---|---|---|---|
| Interpret and evaluate psychological research – including interpreting graphical depictions of data, critically assessing statistical methods, and drawing appropriate conclusions. | Exams, Lab assignments | 2, 3, 4, 5, 7 | A |
| Identify and apply the appropriate quantitative analysis techniques required to address questions in psychological research or to help inform or generate solutions to personal, social, and/or societal problems. | Exams, Lab assignments | 2, 3, 4, 7 | A |

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|---|---|---|---|
| Input, organize, and manipulate data, and conduct statistical analyses using statistical software (or by hand) | Exams, Lab assignments | 3 | A |
| Describe the advantages, limitations, and assumptions of different research and/or statistical methods and apply these methods to real-world problems (e.g. scenarios given in lab assignments). | Exams, Lab assignments | 2, 3, 4, 7 | A |
| Communicate psychological research findings effectively, to both scientific and non-scientific audiences, including the appropriate and effective use of figures, graphs, and tables (and APA style) | Exams, Lab assignments | 3, 4, 5 | A |
| Critically assess the limitations of psychological research that is not diverse or representative. Describe how these factors can affect the validity and reliability of statistical analysis, and how to correct these issues. | Exams, Lab assignments | 1, 2, 5, 8 | 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 in a diverse world, 7 = apply psychological knowledge and skills, 8 = Demonstrate multicultural competence and awareness of issues related to equity, diversity,* and inclusion. Level of PLO achievement facilitated by this course: I = introductory, C = competency, A = advanced.

## 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.

## Course Format

Class materials will be posted to the course D2L page by the day/time of each scheduled class as per the course schedule below.

## Prerequisites

Psyc 312 (A and B) – Experimental Design and Quantitative Research Methods in Psychology
OR Psyc 300 and 301 – Research Methods and Data Analysis in Psychology I and II

AND admission to either the Psychology major or Honors Program

## Required Text

Field, A. (2017). *Discovering statistics using IBM SPSS statistics* (5th North American ed.). London: Sage Publications Ltd.

The textbook is available in the bookstore, as well as through online retailers. Please ensure that you are getting the North American edition, though.

## Course Website
The course website is on D2L at https://d2l.ucalgary.ca

It is on this website that you will find important announcements, download lecture slides, hand in assignments, and find links to other resources (as necessary). Please check it often.

**Course Expectations**

Although the course is now to be delivered online, I still have some expectations for both the students as well as for myself, below. In general, these all boil down to one simple rule, though: **I expect us all to be respectful of one another, and for each of us to do our part in making this a safe, comfortable learning environment for *everyone*.** We are facing a unique situation, but by working together we can make this class something that we can all be proud of! Most of all, I will insist upon maintaining the same kind of civil atmosphere – in which members of the class treat each other with mutual respect – that we had in our in-person format. It is through this kind of learning environment what we can focus our attention and energy on teaching and learning, rather than on frustration, conflict, and distrust. ***Please note: it is sometimes easier to say mean-spirited things online than it is in person. Even though it is an online class, remember that the people that you are engaging with (e.g. in a group chat) are still the same <u>people</u> and <u>classmates</u> that we had in our lectures. As such, I will hold and strictly enforce all the same guidelines of mutual respect that we had for our in-person lectures.***

<u>Expectations of Students</u>

- **To be prepared, and attentive during class**
    - In this course, ***lectures will be delivered in an asynchronous online format***. This means that I will record lectures and post them online so that students can listen and go through the lectures according to their own schedules and lives. This is particularly important (to me) at a time when some students might need to be working, to take care of loved ones, or who simply feel a little overwhelmed. This will allow you to engage with the lectures when you wish. If I can make a suggestion, though, I would point out that it is sometimes easy to procrastinate and then need to learn all the material at the end of the year. This is a bad idea. ***Try to set a schedule where you will listen to lectures at the same time each week***. For many, this might mean listening to lectures for one hour, right at 11:00 on MWF, for example. For others, it might be a different schedule. But please do yourself a favor and try to set and abide by a schedule.

- **To make every effort not to be a distraction to yourself or others**
    - In an in-person class, we often talk about distracting those around us, causing them to potentially miss some of the material. But, ***engaging in <u>other</u> activities during online learning – such as texting, checking email, checking social media – are incredibly tempting since you're already online. However, these activities will negatively impact your learning, as they cause distractions and make you less efficient and effective in your learning*** (as we learn about when I teach a course in Cognitive Psychology and we discuss something called "switch costs"). I would therefore strongly suggest that, when you go through online lectures, try to close all other tabs in your browser, turn off your phone, etc. That is, set aside the 75 or 50 or even just 15 minutes <u>just</u> for learning. Don't allow for distractions to yourself!

- **To be willing to participate positively and constructively during class**
    - As outlined above, active participation is a critical component to my teaching style, and improves student learning and retention of material. There will still be activities in the online classes, and I hope that all students will still engage in these activities in an online learning platform. ***These activities increase engagement with the material, as well as retention of that material for exams.***

- **To treat all other students in the class, as well as the instructor, with respect**
  - We are very lucky to have a diverse population of students at the U of C, who come from different backgrounds and bring different experiences with them. These differences are a valuable means by which we will learn about individual and group differences. ***I will insist that all of us treat those students who are willing to share their thoughts and experiences with our full respect and attention. Avoid disrespectful comments, innuendos, and any and all other negative commentary***. As I said above, this seems to be more of an issue in many online environments (see almost every chat room ever, for an example). However, I will stress that these are still the same people, students, and friends that are present in many of our in-person classes. ***If something wasn't acceptable as a comment in an in-person class, it's not acceptable online. I will still enforce the same guidelines of mutual respect among all students, whether in an online or in-person class.***

- **To understand and abide by the procedures and regulations outlined in the outline**

Expectations of the Instructor

- **To be prepared and enthusiastic during lectures to facilitate student learning**
  - As I mentioned in the opening note on the syllabus, I love this course. I will always be prepared and happy to be teaching you.

- **To treat all students with dignity, respect, and fairness in order to provide a class structure that encourages learning**
  - Teachers who are disrespectful to students need to find another occupation. Seriously. A proper learning environment is one in which students feel safe to share their thoughts, experiences, or questions. Therefore, I have always treated my students with dignity, respect, and fairness. I do not play favorites, and I *never* belittle my students. I know that it is a bit daunting to raise your hand (or comment online) to share your personal experiences in class. As such, I hold *all* my students in high esteem, regardless of how well they perform in my classes, and I try my best to communicate this to them through both my words and my actions.

- **To grade objectively, consistently, and to return grades in a timely manner**
  - Again, I do not play favorites. In an attempt to keep marking from being subjective, all written materials are marked using a rubric (grading scheme) which is applied fairly and consistently to all students. The grading time may vary with time of year and the type of assignment. However, you will always have your assignment grades returned in as timely a manner as possible.

- **To be genuinely concerned about and interested in student learning and performance, and to be sensitive to student needs or concerns**
  - I always want my students to succeed. I do not provide "easy bonus marks" but I will readily try to help any student with *any* aspect of the course that they are struggling to understand. If special circumstances arise that might adversely affect your course performance, please let me know as soon as possible. I can't help if I don't know about it.

- **To understand and abide by the procedures and regulations outlined in the syllabus**

Asking Questions in this Course

**Asking questions is an extremely important part of learning**. I strongly encourage you to ask a question whenever you require clarification on an issue, or have an observation to make yourself. Given the online format for the class, you have a couple of different options. The first is to ask questions directly to me via email. I am more than happy to answer questions this way. Alternatively, you can post questions or comments on the discussion board that will be added to our D2L website. I will generally answer email questions within 2 business days (though it might be 3 days during particularly busy times), and discussion boards will be checked every 3-4 days.

 **Note:** Routine questions such as "When and where is the exam?" or "What chapters are covered for the midterm?" (and so on) may already be addressed on the course website and are listed in the tentative Lecture Schedule.

**Assessment Methods**

 **Exam 1 (27.5%)**             **October 8th, 2020**
 *Covers all class material until Oct 1 (Topics 1-3)*
 40 points, multiple choice and short answer questions

 **Exam 2 (27.5%)**           **November 24th, 2020**
 *Covers all class material from Oct 6  – Nov 19 (Topics 4-7)*
 40 points, multiple choice and short answer questions

 **Exam 3 (15%)**              **December 9th, 2020**
 *Covers <u>all</u> class material, with emphasis on material after Nov 19*
 25 points, multiple choice and short answer questions

 **Laboratory Assignments (30%)**
 *Several lab assignments will be due during the course of the semester.*
 *For more information on the topics, due dates, and more, please see below*
 ==*Students must achieve a passing grade in both the class and lab components to pass this course.*==

Extra Information about Exams:

 **Exams will be delivered online, using D2L under Assessments > Quizzes.**

 **The exams will be available for a 24-hour period on the day of the exam, in order to accommodate student work schedules, time zone differences, and so on. Exams will be "available" starting at 8:00 AM on the date of the exam, and will be available for 24 hours. But, please note that the exams will be time-limited once they have begun (see below)**

 **The exams will be considered to be open-book. For this course, an open-book exam means that the use of class notes and textbook is permitted. However, the use of online resources are prohibited. And, exams are to be your work, and yours alone. There is to be no collaboration or communication with other students, peers, friends, or anyone else (outside of questions for your instructor) at any point while the exam is "active" – whether electronically or in person.**

**Despite the open-book policy, please note that the exams will be time-limited (once you start, you will have 75 minutes to complete each of the first two exams (and 45 minutes for the 3rd exam). As such, it is in your best interests to study and know the material well, as you will not have time to check or look up every single answer!**

**Students will be required to electronically sign a confidentiality agreement before taking the exam (it basically shows up like question 1)**

Extra Information about Lab Assignments:

**Lab assignments will be handed in online using the D2L dropbox. They are due at 9:00 a.m. on the date shown on the course schedule (below)**

**Without approved documentation, late lab assignments will receive a penalty of 20% per day late (including weekend days)**, up to a maximum of 4 days late. After this time, the assignment will receive a grade of 0.

There are 8 lab assignments over the course of the semester. When calculating your final grade, of which assignments are worth 30%, **the 8 assignments will count equally toward the 30% component (i.e. 3.75% per lab).**

**Lab Topics:**
> *Note: Dates for labs, and due dates for the lab assignments may be found below, included in the Lecture Schedule.*

> **Lab 1:** Refresher on SPSS, Critical Thinking, Defining Variables
> **Lab 2:** Experimental and Non-Experimental Research Methods
> **Lab 3:** T-tests, Effect Sizes, and Power Analysis
> **Lab 4:** Oneway and Factorial ANOVA
> **Lab 5:** Post-hoc Contrasts in Oneway and Factorial Designs
> **Lab 6:** Planned and Complex Contrasts in Oneway and Factorial Designs
> **Lab 7:** Within-Subjects ANOVA (and contrasts)
> **Lab 8:** Correlations and (Semi-)Partial Correlations

**University of Calgary Academic Integrity Policy**
Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity.
Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional code of conduct and promote academic integrity in upholding the University of Calgary's reputation of excellence. It is your responsibility to ensure that you have read and are familiar with the student academic misconduct policy: https://www.ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf.

**Department of Psychology Criteria for Letter Grades**

Psychology course instructors 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**

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|---|---|---|---|---|---|---|---|
| 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 percent 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**
Please note that these dates are approximations. Some topics may take longer or shorter than planned.

| Date | Topic | Lab Topic | Assignment |
|---|---|---|---|
| T Sep 8 | *Fall Lectures Begin* <br> Introduction & Welcome to P411 | | |
| R Sep 10 | Review: Critical Thinking, Defining and Measuring Variables | | |

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| T Sep 15 | Review: Measuring Variables, Correlation | Lab 1: Refresher on SPSS, Critical Thinking, and Defining Variables | |
| R Sep 17 | Review: Correlation, Experimental Methods<br><br>*Last day to drop a course without financial penalty.* | | |
| F Sep 18 | *Last day to add or swap a course.* | | |
| T Sep 22 | Reliability & Validity, T-tests, Cohen's d | Lab 2: Non-experimental Research Methods | **Lab Assignment 1 due (day of lab)** |
| R Sep 24 | T-test & Cohen's d<br>Hypothesis Testing<br>  ▪ Type I and Type II Error rates<br>  ▪ Power Analysis | | |
| F Sep 25 | *Fee Payment Deadline for Fall Full and Half Courses* | | |
| T Sep 29 | Hypothesis Testing,<br>Replication Crisis:<br>  ▪ Problems with NHST<br>  ▪ P-hacking<br>  ▪ HARKing<br>  ▪ Solutions | Lab 3: T-tests, Effect Sizes, Power Analysis | **Lab Assignment 2 due (day of lab)** |
| R Oct 1 | | | |
| T Oct 6 | Between-Subjects One-Way ANOVA | *No Lab (Exam 1)* | |
| R Oct 8 | **EXAM 1 (ONLINE, AVAILABLE FOR 24 HRS)** | **27.5%** | **Topics 1-3** |
| M Oct 12 | ***Thanksgiving Day, University closed*** *(except Taylor Family Digital Library, Law, Medical, Gallagher and Business Libraries).* **No lectures.** | | |
| T Oct 13 | Between-Subjects One-way & Factorial ANOVA | Lab 4: One-way and Factorial ANOVA | **Lab Assignment 3 due (day of lab)** |
| R Oct 15 | | | |
| T Oct 20 | Planned & Post-Hoc Contrasts (Between-Subj)<br>  ▪ Orthogonality<br>  ▪ Built-in Contrasts (SPSS)<br>  ▪ Polynomial Contrasts<br>  ▪ Custom Contrasts<br>  ▪ Effect Sizes of Contrasts | Lab 5: Post-hoc Contrasts in One-way and Factorial ANOVA | **Lab Assignment 4 due (day of lab)** |
| R Oct 22 | | | |
| T Oct 27 | Custom Contrasts for Factorial Designs | Lab 6: Planned Contrasts in One-way and Factorial ANOVA | **Lab Assignment 5 due (day of lab)** |
| R Oct 29 | | | |
| T Nov 3 | Within-Subjects ANOVA & Contrasts | Lab 7: Within-Subjects ANOVA (and contrasts | **Lab Assignment 6 due (day of lab)** |
| R Nov 5 | | | |
| Nov 8-14 | ***Term Break. No lectures.*** | | |

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|---|---|---|---|
| M Nov 11 | **Remembrance Day (observed), University closed** (except Taylor Family Digital Library, Law, Medical, Gallagher and Business Libraries). **No lectures.** | *No Labs (Term Break)* | |
| T Nov 17 | Within Subjects ANOVA & Contrasts (cont'd) | *No Lab (Exam 2)* | |
| R Nov 19 | Correlations (introduction) | | |
| T Nov 24 | **EXAM 2 (ONLINE, AVAILABLE FOR 24 HRS)** | **27.5%** | **Topics 4-7** |
| R Nov 26 | Correlations (cont'd)<br> ▪ Pearson<br> ▪ Biserial & Point Biserial<br> ▪ Partial & Semi-Partial | Lab 8: Correlations and (Semi-)Partial Correlations | **Lab Assignment 7 due (11/28)** |
| T Dec 1 | | | **Lab Assignment 8 due (12/4)** |
| R Dec 3 | Regression<br> ▪ Simple Regression<br> ▪ Multiple Regression | | |
| T Dec 8 | | | |
| W Dec 9 | **EXAM 3 (ONLINE, AVAILABLE FOR 24 HRS)** | **15%** | **Topics 8-9** |
| | *Fall Term Lectures End.*<br>*Last day to withdraw with permission from Fall Term half courses.* | | |
| Dec 12-23 | *Winter Term Final Examination Period* | | |

**Absence From A Test/Exam**

Makeup tests/exams are **NOT** an option without the approval of the instructor. Students who miss a test/exam have up to 48 hours to contact the instructor to ask for a makeup test/exam. It's the instructor's discretion if they will allow a make-up 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. Once approved by the instructor a makeup test/exam must be written within 2 weeks of the missed test/exam on a day/time scheduled by the instructor. 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 https://www.ucalgary.ca/registrar/exams/deferred-exams.

**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

**Reappraisal of Graded Term Work** http://www.ucalgary.ca/pubs/calendar/current/i-2.html

**Reappraisal of Final Grade** http://www.ucalgary.ca/pubs/calendar/current/i-3.html

**Academic Accommodations**
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/. 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.pdf.

**Academic Misconduct**
For information on academic misconduct and its consequences, please see the University of Calgary Calendar at http://www.ucalgary.ca/pubs/calendar/current/k.html

**Instructor Intellectual Property**
Course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor(s). These materials may NOT be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

**Copyright Legislation**
All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) and requirements of the copyright act (https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

**Freedom OF Information and Protection of Privacy**

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary

**Student Support and Resources**

**https://www.ucalgary.ca/registrar/registration/course-outlines**

**Important Dates**

The last day to drop this course with no "W" notation and **still receive a tuition fee refund** is **Thursday, September 17, 2020.**  Last day add/swap a course is **Friday, September 18, 2020**.  The last day to withdraw from this course is **Wednesday, December 9, 2020**.

https://www.ucalgary.ca/pubs/calendar/current/academic-schedule.html