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**PSYC 312(L30) Experimental Design and Quantitative Research Methods in Psychology**

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|----------------------|--------------------|---------------------------|---------------------|
| <b>Instructor:</b>   | Dr. Melissa Boyce  | <b>Lecture Location:</b>  | Admin 142           |
| <b>Phone:</b>        | 403-210-6257       | <b>Lecture Days/Time:</b> | Tues/Thurs 3-5:30pm |
| <b>Email:</b>        | mboyce@ucalgary.ca |                           |                     |
| <b>Office:</b>       | Admin 258          |                           |                     |
| <b>Office Hours:</b> | TBA                |                           |                     |

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Contact your instructor regarding general course issues, questions about lecture material and course content, and grading of exams.

### Course Description and Goals

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 projects are integrated with the lecture schedule.

### Prerequisites

Math 30 or 31 or Mathematics II and Psyc 205 – Principles of Psychology

### Required Text

Howell, D. C. (2011). *Fundamental Statistics for the Behavioral Sciences (7th Ed.)*. Belmont, CA: Thomson Wadsworth. (located in the bookstore)

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.

### Course Website

The course website is located on blackboard: <https://blackboard.ucalgary.ca/webapps/login/>.

Notes for each week's classes will be posted at the beginning of the week. In addition, announcements, grades, and information regarding lab assignments and your research paper will be posted on this site.

## Evaluation

### Class components (60% of final grade).

*Exams.* There will be four exams during this course (2 scheduled during class time and 2 scheduled during the Spring and Summer final exams), each of which will be worth 15% of your mark and will cover lecture material. Exams will feature multiple-choice and short answer questions and are non-cumulative insofar as they will be limited to material covered since the previous test. However, many of the concepts in this course are inherently cumulative in that they assume knowledge and understanding of material introduced earlier.

Exam dates are as follows:

Exam 1: May 31, 2012

Exam 2: June 21, 2012

Exam 3: July 26, 2012

Exam 4: TBA (during the final exam period Aug 17-18)

### Lab components (40% of final grade).

*Report.* A typed, double-spaced, scientific report based on a study to be conducted during lab. The final version, worth 10% of your mark, is due at the beginning of class on Thursday, August 9. Instructions for completing your report will be posted on blackboard and provided in lab.

*Labs.* Each student must be registered in a lab section associated with this lecture section. There will be eleven lab assignments, which in total will comprise 30% of your grade. Lab assignments will be due in hard copy at the beginning of lab (due dates indicated on lab schedule). Late assignments will not be accepted without a medical note.

The grades allocated for each assignment are as follows:

|   |           |
|---|-----------|
| Lab Assignment 1: Literature Search           | 3%        |
| Lab Assignment 2: Observational Research      | 3%        |
| Lab Assignment 3: Survey Research Parts 1 & 2 | 3%        |
| Lab Assignment 4: Poster                      | 3%        |
| Lab Assignment 5: <i>t</i> -Tests             | 3%        |
| Lab Assignment 6: Factorial ANOVA             | 3%        |
| Lab Assignment 7: Draft of Intro & Methods    | 3%        |
| Lab Assignment 8: Paired <i>t</i> -Tests      | 3%        |
| Lab Assignment 9: Repeated Measures ANOVA     | 3%        |
| Lab Assignment 10: Regression                 | <u>3%</u> |
| Total   | 30%       |

**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 assignments 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.

**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.

**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           | Topic  | Relevant Web Modules                               | Text Material | Lab Topic  | Assignment Due |
|------|----------------|--|--|---------------|--|----------------|
| 1    | R<br>May<br>10 | Introduction to the Course and The Science of Psychology   | -Intro to Research Methods: Psychology and Science | Ch 1 & 2      | No lab   |                |
| 2    | M<br>May<br>14 | <i>Last day for registration/change of registration and last day to drop a course with tuition refund.</i> |  |               | Writing Research Papers in APA format and Conducting a Literature Search |                |
|      | T<br>May<br>15 | Role of Statistics in Research and Ethics  | -Statistics Concepts<br><br>-Ethics                |               |  |                |
|      | R<br>May       | Research Ideas and   | -Generating and Refining                           |               |  |                |

|   |                 |   |   |                      |  |   |
|---|-----------------|---|---|----------------------|--|---|
|   | 17              | Hypotheses  | Research Hypotheses   |                      |  |   |
| 3 | T<br>May<br>22  | Measuring and Manipulating Variables and Choosing the Best Measures | -Measurement: Reliability, Construct Validity<br><br>-Scaling and Sensitivity |                      | No lab (due to Victoria Day)                                 |   |
|   | R<br>May<br>24  | Non-Experimental Methods I  | -Descriptive Methods: Overview<br><br>-Archival Data, Observation             |                      |  |   |
| 4 | T<br>May<br>29  | Non-Experimental Methods II and Review                              |   |                      | Observational Research and Survey Part 1: Survey Development | Literature Search Assignment due at the beginning of lab      |
|   | R<br>May<br>31  | <b>Exam 1</b>   |   | All material to date |  |   |
| 5 | T<br>June<br>5  | Internal Validity and Plotting Data                                 | -Internal Validity: Regression to the Mean                                    |                      | Putting Together a Poster                                    | Observational Research Assignment due at the beginning of lab |
|   | R<br>June<br>7  | Measures of Central Tendency and Measures of Variability            |   | Ch. 4 & 5            |  |   |
| 6 | T<br>June<br>12 | The Normal Distribution and z-Scores                                | -Intro to Hypothesis Testing: The Normal Distribution<br><br>-z-Scores        | Ch. 6                | Survey Research Part 2: Data Analysis                        |   |

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|   | R<br>June<br>14    | Probability and Hypothesis Testing Part I                      | -Basic Concepts of Probability<br><br>-Intro to Hypothesis Testing: Hypothesis Testing, Sample Distributions           | Ch. 7                     |  |  |
| 7 | T<br>June<br>19    | Hypothesis Testing Part II and Review                          | -Type I and II Errors<br><br>-One-Tailed and Two-Tailed Tests  | Ch. 8                     | Poster Session and Participate in online study and outline of final research paper | Survey Research Assignment due at the beginning of lab |
|   | R<br>June<br>21    | <b>Exam 2</b>  |  | All material since Exam 1 |  |  |
|   | June<br>26 -<br>28 | Spring Session Reading Week – No Lecture                       |  |                           |  |  |
| 8 | T<br>July<br>3     | The One-Sample t-test and Confidence Limits on the Mean        | -Simple Experiments and Hypothesis Test of Means: Hypothesis Testing: One Sample<br><br>-Confidence Limits on the Mean | Ch. 12                    | No lab due to Canada Day   |  |
|   | R<br>July<br>5     | Experiments with Two Groups: The t-test for Independent Groups | -The Simple Experiment: Comparing Two Groups<br><br>-Hypothesis  | Ch. 14                    |  |  |

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|    |                 |   | Testing: Two Independent Samples   |                                  |   |   |
| 9  | T<br>July<br>10 | Power and Experiments with More than Two Groups: One-Way ANOVA                | -Statistical Power<br><br>-Multiple Group Experiments and ANOVA: The Multiple Group Experiment<br><br>-One Way ANOVA | Ch. 15 & 16                      | t-tests and One-Way ANOVA: Analyze Experiment |   |
|    | R<br>July<br>12 | Multiple Comparisons and Practice with One-Way ANOVA and Multiple Comparisons |  |                                  |   |   |
| 10 | T<br>July<br>17 | Factorial Designs   | -Factorial Designs   | Ch. 17                           | Factorial ANOVA and Paired t-tests            | t-test Assignment and Draft of Research Paper Intro and Methods due at the beginning of lab |
|    | R<br>July<br>19 | Factorial ANOVA and Review  | -Factorial ANOVA   |                                  |   |   |
| 11 | T<br>July<br>24 | No Class – READING DAY  |  |                                  | No lab (due to July 24 reading day)           |   |
|    | R<br>July<br>26 | <b>Exam 3</b>   |  | <b>All material since Exam 2</b> |   |   |
| 12 | T<br>July       | Within-Subjects Designs: The Paired t-  | -Repeated Measures: Matched-Pair   | Ch. 13                           | Repeated Measures ANOVA and                   | Factorial ANOVA and Paired t-test   |

|    |                  |   |  |                                    |                                 |   |
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|    | 31               | test  | Designs,<br>Within-Subjects<br>Designs<br><br>-Hypothesis<br>Testing: Related<br>Samples |                                    | Regression                      | Assignments<br>due at the<br>beginning of<br>lab  |
|    | R<br>Aug<br>2    | Repeated Measures<br>ANOVA  |  | Ch. 18                             |                                 |   |
| 13 | T<br>Aug<br>7    | Correlation and<br>Regression I   | -Correlation<br>and Regression:<br>Correlation<br><br>-Regression                        | Ch. 9 &<br>10                      | No Lab (due to<br>Heritage Day) | Repeated<br>Measures<br>ANOVA and<br>Regression<br>Assignments<br>due at the<br>beginning of<br>class on<br>Thursday,<br>August 9 |
|    | R<br>Aug<br>9    | Regression II and<br>Multiple Regression<br><br><b>RESEARCH PAPER<br/>DUE AT THE<br/>BEGINNING OF CLASS</b> | -Multiple<br>Regression  | Ch. 11                             |                                 |   |
| 14 | T<br>Aug<br>14   | Chi-Square and<br>Review  | -Chi-Square  | Ch. 19                             |                                 |   |
|    | W<br>Aug<br>15   | <i>Last day to withdraw.</i>  |  |                                    |                                 |   |
|    | Aug<br>17-<br>18 | <b>Exam 4</b>   | (date to be set<br>by the<br>Registrar)  | All<br>material<br>since<br>Exam 3 |                                 |   |

### 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. 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**

It is the student's responsibility to request academic accommodations. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 403-220-8237. 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 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.

### **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 via the Department Office (Admin 275), 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 (2) credits (2%) per course, including this course, may be applied to the student's final grade. Students earn 0.5% (0.5 credits) for each full 30 minutes of participation.** 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 **June 25<sup>th</sup>, 2012.**

### **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 170 and may be contacted at 403-220-5567.

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

**Student Union Faculty Rep.:** Phone: 403-220-3913 [socialscirep@su.ucalgary.ca](mailto:socialscirep@su.ucalgary.ca)

### **Important Dates**

The last day to drop this course and **still receive a tuition fee refund** and the last day for registration/change of registration is **May 14, 2012.** The last day to withdraw from this course is **June 22, 2012.**