



Department of Psychology
Psychology 312 (L01) – Experimental Design and Quantitative Research Methods in
Psychology
Fall 2009/Winter 2010

Instructor: Dr. Melissa Boyce **Lecture Location:** ST 140
Phone: 403-210-6257 **Lecture Days/Time:** Tues/Thurs
2:00 – 3:15 pm
Email: mboyce@ucalgary.ca
Office: A258
Office Hours: TBA

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

Labs

| Section | Day | Time | Location | Lab Instructor | Email |
|---------|-------|------------------|----------|-------------------|--|
| B01 | Mon | 9:00 – 10:50 am | SS 018 | Catie Phillips | ciphilli@ucalgary.ca |
| B02 | Mon | 11:00 – 12:50 pm | SS 018 | Catie Phillips | ciphilli@ucalgary.ca |
| B03 | Mon | 1:00 – 2:50 pm | SS 018 | Nicole Cornell | nkcornel@ucalgary.ca |
| B04 | Mon | 3:00 - 4:50 pm | SS 018 | Nicole Cornell | nkcornel@ucalgary.ca |
| B05 | Mon | 5:00 – 6:50 pm | SS 018 | Rowan Sciban | rasciban@ucalgary.ca |
| B06 | Tues | 9:00 – 10:50 am | SS 018 | Nicole Percival | nicole.percival@ucalgary.ca |
| B07 | Tues | 11:00 – 12:50 pm | SS 018 | Nicole Percival | nicole.percival@ucalgary.ca |
| B08 | Wed | 11:00 – 12:50 pm | SS 018 | Andrea Burnett | TBA |
| B09 | Wed | 1:00 – 2:50 pm | SS 018 | Andrea Burnett | TBA |
| B10 | Thurs | 5:00 – 6:50 pm | SS 018 | Rowan Sciban | rasciban@ucalgary.ca |
| B11 | Fri | 12:00 – 1:50 pm | SS 018 | Jocelyn Wiltshire | jwiltshi@ucalgary.ca |
| B12 | Fri | 2:00 – 3:50 pm | SS 018 | Jocelyn Wiltshire | jwiltshi@ucalgary.ca |

Contact your lab instructor regarding material presented in lab, lab assignments, & questions about lab assignment grading.

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. (2008). *Fundamental Statistics for the Behavioral Sciences* (6th Ed.). Belmont, CA: Thomson Wadsworth.

It is also strongly recommended that you obtain a copy of the *Publication Manual of the American Psychological Association* (5th Ed.) as you will be expected to conform to APA format in all assignments you submit.

NOTE: We will be using Turning Point clickers in this class. They have been bundled with the textbook to save you money; however, if you have purchased a used textbook, extra clickers are available for purchase in the bookstore.

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. Web-based modules will be found here as well that you may use as an additional resource in this course.

Evaluation

Class components (60% of final grade).

Exams. There will be six in-class exams during this course, each of which will be worth 10% of your mark and will cover lectures and the web modules. Exams will feature multiple-choice 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:

Fall Term

Exam 1: October 1, 2009

Exam 2: November 5, 2009

Exam 3: December 8, 2009

Winter Term

Exam 4: February 11, 2010

Exam 5: March 18, 2010

Exam 6: April 15, 2010

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 April 8, one week

before the final exam. 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:

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

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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 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-).

Attendance

It is important that you attend class in order to gain a better understanding of the course material, as you will be responsible for this material on exams and lab assignments. If you miss a lecture, the onus is on you to obtain a copy of the notes. *To that effect, I highly recommend exchanging email addresses with a person in the class so that you can contact him/her to get a copy of the notes should you miss a class.*

Lab attendance is essential. Should you miss a lab, contact your lab instructor immediately in order to determine what you missed and to find out what will be required of you before the next lab.

Tentative Lecture Schedule

Fall Term

| WEEK | DATE | TOPIC | RELEVANT WEB MODULES | READINGS | LAB TOPIC | ASSIGNMENT DUE |
|------|----------------|--|---|----------------|---|---|
| 1 | Tues, Sept 8 | Introduction to Research Methods | | Course Outline | No Lab | |
| | Thurs, Sept 10 | The Science of Psychology | <i>Intro to Research Methods – Psychology and Science</i> | Ch. 1 | | |
| 2 | Tues, Sept 15 | The Role of Statistics in Research | Statistics Concepts | Ch. 2 | Literature Search | |
| | Thurs, Sept 17 | Ethics VIDEO: Stanley Milgram's "Obedience" | Ethics | | | |
| | Fri, Sept 18 | <i>Last day to drop a course with no W grade and tuition refund.</i> | | | | |
| 3 | Tues, Sept 22 | <i>Last day for registration/change of registration.</i> | | | Writing Research Papers (in APA format) | Literature Search Assignment due beginning of lab |
| | Tues, Sept 22 | Research Ideas and Hypotheses | Generating and Refining Research Hypotheses | | | |
| | Thurs, Sept 24 | Measuring and Manipulating Variables | <i>Measurement – Reliability, Construct Validity</i> | | | |

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| 4 | Tues, Sept 29 | Choosing the Best Measures | Scaling and Sensitivity | | No Lab | |
| | Thurs, Oct 1 | Exam 1 | Material to date | | | |
| 5 | Tues, Oct 6 | Non-Experimental Methods I | <i>Descriptive Methods – Overview</i> | | Observational Research | |
| | Thurs, Oct 8 | Non-Experimental Methods II | Archival Data, Observation | | | |
| 6 | Tues, Oct 13 | Non-Experimental Methods III | | | Survey Research Pt 1: Survey Development **MUST COMPLETE ONLINE SURVEY BY SUN, OCT 18 | Observational Research Assignment due beginning of lab |
| | Thurs, Oct 15 | Internal Validity | <i>Internal Validity – Internal Validity: Regression to the Mean</i> | | | |
| 7 | Tues, Oct 20 | Alternative Research Designs | | | Options for Psychology Majors & Applying to Graduate School | |
| | Thurs, Oct 22 | Plotting Data | | Ch. 3 | | |
| 8 | Tues, Oct 27 | Measures of Central Tendency | | Ch. 4 | Survey Research Pt 2: Data Analysis | |
| | Thurs, Oct 29 | Measures of Variability | | Ch. 5 | | |
| 9 | Tues, Nov 3 | Review | | | No Lab | |
| | Thurs, Nov 5 | Exam 2 | Material since Exam 1 | | | |
| 10 | Tues, Nov 10 | The Normal Distribution | <i>Intro to Hypothesis Testing – The Normal Distribution</i> | Ch. 6 | No Lab | |
| | Thurs, Nov 12 | <i>Reading Day. No lectures.</i> | | | | |
| 11 | Tues, Nov 17 | Z-Scores | Z-Scores | | Putting together a Poster | Survey Research Assignment due beginning of lab |
| | Thurs, Nov 19 | Probability Theory | Basic Concepts of Probability | Ch. 7 | | |
| 12 | Tues, Nov 24 | Chi-Square | <i>Chi-Square</i> | Ch. 19 | Chi-Square | |
| | Thurs, Nov 26 | Hypothesis Testing I | <i>Intro to Hypothesis</i> | Ch. 8 | | |

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| | | | <i>Testing – Hypothesis Testing, Sample Distributions and Hypothesis Testing</i> | | | |
| 13 | Tues, Dec 1 | Hypothesis Testing II | Type I and II Errors, One-Tailed and Two-Tailed Tests | Ch. 8 | Poster Session | Chi-Square Assignment due beginning of lab ----- Poster due beginning of lab |
| | Thurs, Dec 3 | Review | | | | |
| 14 | Mon, Dec 7 | <i>Last day to participate in research and allocate research credits.</i> | | | No lab | |
| | Tues, Dec 8 | Exam 3 | Material since Exam 2 | | | |
| | Dec 25 - 31 | <i>Holiday Observance. Session Break. University closed.</i> | | | | |

Winter Term

| WEEK | DATE | TOPIC | RELEVANT WEB MODULES | READINGS | LAB TOPIC | ASSIGNMENT DUE |
|-----------|---------------|---|---|----------|---|----------------|
| 15 | Tues, Jan 12 | The One Sample <i>t</i> -test | <i>Simple Experiments and Hypothesis Test of Means – Hypothesis Testing: One Sample</i> | Ch. 12 | No Lab | |
| | Thurs, Jan 14 | Confidence Limits on the Mean | Confidence Limits on the Mean | | | |
| 16 | Tues, Jan 19 | Experiments with Two Groups | The Simple Experiment: Comparing Two Groups | Ch. 14 | Participate in online study & outline of research paper | |
| | Thurs, Jan 21 | The <i>t</i> -test for Independent Groups | Hypothesis Testing: Two | | | |

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| | | | Independent Samples | | | |
| 17 | Tues, Jan 26 | Statistical Power | <i>Statistical Power</i> | Ch. 15 | <i>t</i> -tests | <i>t</i> -test Assignment due end of lab |
| | Thurs, Jan 28 | Experiments with More Than Two Groups | <i>Multiple Group Experiments and ANOVA – The Multiple Group Experiment</i> | Ch. 16 | | |
| 18 | Tues, Feb 2 | One-Way ANOVA | One-Way ANOVA | | One-Way ANOVA: Analyze Experiment | |
| | Thurs, Feb 4 | Multiple-Comparison Procedures | | | | |
| 19 | Tues, Feb 9 | Review | | | No Lab | |
| | Thurs, Feb 11 | Exam 4 | Material since Exam 3 | | | |
| 20 | Tues, Feb 16 & Thurs, Feb 18 | Reading Week – No Classes | | | No Lab | |
| 21 | Tues, Feb 23 | Factorial Designs I | Factorial Designs | Ch. 17 | Factorial ANOVA | |
| | Thurs, Feb 25 | Factorial Designs II | | | | |
| 22 | Tues, Mar 2 | Factorial ANOVA I | Factorial ANOVA | | Research Paper Q & A | Factorial ANOVA Assignment due beginning of lab |
| | Thurs, Mar 4 | Factorial ANOVA II | | | | |
| 23 | Tues, Mar 9 | Within-Subjects Designs | <i>Repeated Measures – Matched-Pair Designs, Within-Subject Designs</i> | Ch. 13 | Paired <i>t</i> -tests | Draft of Introduction and Methods due beginning of lab |
| | Thurs, Mar 11 | The Paired <i>t</i> -test | Hypothesis Testing: Related Samples | | | |
| 24 | Tues, Mar 16 | Review | | | No Lab | |
| | Thurs, Mar 18 | Exam 5 | Material since Exam 4 | | | |
| 25 | Tues, Mar 23 | Repeated Measures ANOVA | Repeated Measures | Ch. 18 | Repeated Measures | Paired <i>t</i> -test Assignment |

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| | Thurs, Mar 25 | Correlation | ANOVA <i>Correlation and Regression – Correlation</i> | Ch. 9 | ANOVA | due beginning of lab |
| 26 | Tues, Mar 30 | Regression I | Regression | Ch. 10 | No Lab | |
| | Thurs, Apr 1 | Regression II | | | | |
| 27 | Tues, Apr 6 | Multiple Regression | Multiple Regression | Ch. 11 | No Lab | Research Paper due at beginning of class Apr 8 ----- Repeated Measures ANOVA Assignment due beginning of lab |
| | Thurs, Apr 8 | Critiquing Research | <i>Introduction to Research Methods – Reading and Evaluating Research</i> | | | |
| 28 | Tues, Apr 13 | Review | | | No Lab | |
| | Thurs, Apr 15 | Exam 6 <i>Last day to participate in research and allocate research credits.</i> | Material since Exam 5 | | | |

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 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.

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 **Dec 7th, 2009 for the Fall term and Apr 15th, 2010 for the Winter term.**

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 220-5567.

Student Union VP Academic: Phone: 220-3911 suvpaca@ucalgary.ca
Student Union Faculty Rep.: Phone: 220-3913 socialscirep@su.ucalgary.ca

Important Dates

The last day to drop this course and **still receive a fee refund** is **Sep 18th, 2009**. The last day to withdraw from this course is **Apr 16, 2010**.