## 

**Design and Analysis in Experimental Psychology**

**PSYCO 413**, **B2**

**Winter 2021**

**Instructor: Dr. Yvonne Wong (Ph.D. Neuroscience)**

**Office:** Online after class or Fridays at 10:00 AM via Google Meet

**E-mail:** [yjwong@ualberta.ca](mailto:yjwong@ualberta.ca) *(Please add “PSYCO413” in subject header and send from your ualberta email address, otherwise your email may be filtered out as spam.)*

**Web Page: eClass**

**Office Hours:** Online after class or Fridays at 10:00 AM via Google Meet or by email appointment.

**Teaching Assistant(s):** Daniel Robles

**Lecture Room & Time:** Mondays and Wednesdays, 13:00 – 14:20 online in Google Meet or Zoom, synchronous lectures which will be recorded.

**Course Description:** Provides the background necessary to design and analyze data in multiple areas of experimental psychology and prepares students to conduct original research. Topics include sampling distributions and hypothesis testing: issues in and analysis of between-subjects, within-subjects, and mixed designs; trend analysis; planned and post-hoc comparisons; fixed and random effects factors; and efficiency of power and various experimental designs.

**Course Prerequisites:**

STAT 141 or 151 or SCI 151 AND any 300-level PSYCO.

It is the responsibility of the student to ensure they have the appropriate prerequisite(s) for the course.

**Technology Requirements/Recommendations for Remote Learning:**

For an optimal online learning experience, please review the University guidelines for [Technology for Remote Learning](https://www.ualberta.ca/campus-life/technology-requirements.html). If a student has any questions or concerns about these requirements/recommendations, it is highly recommended that they contact the instructor at the beginning of term.

This course requires a laptop or computer that is able to run R and R-Studio and Microsoft Excel with the Data Analysis Package. You should also have stable access to the internet. For remote access to other software packages (SPSS, etc…) please contact the University of Alberta IST (LabConnect). This will still require a stable internet connection.

**Student Resources for Remote Learning:**

Online learning may be new to you. Check out tips for success and find out more about online learning on the [Campus Life](https://www.ualberta.ca/campus-life/index.html) page, and specifically on the [Student Resources for Remote Learning](https://www.ualberta.ca/current-students/academic-success-centre/resources/index.html) page.

**Course Objectives and Expected Learning Outcomes:** This course introduces students to the statistical methodologies that underly many types of experimental designs used in psychology. Emphasis will be placed on understanding the principles and assumptions behind these methodologies along with guidance about best practices for conducting contemporary research (e.g. the use of robust measures of location). This course is also designed to serve as an introduction to statistical computing (using R software, Excel, etc…) which has become a fundamental skill of contemporary research practices in all areas of science.

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# Required Textbook: There are no required textbooks for this course, however there are a few recommended and open source learning resources.

**Recommended or Optional Learning Resources****:**

* *Statistical Methods for Psychology 8th Edition* by David Howell
  + eBook version available at <https://www.cengage.ca/shop/ProductDisplay?langId=-1&storeId=10651&catalogId=10052&productId=579460>
* *R for Data Science* by Hadley Wickham & Garrett Grolemund
  + Free (open source) eBook version available at <https://r4ds.had.co.nz/>

**Important Dates:** See the current Calendar for the[Academic Schedule, Dates, and Deadlines](https://calendar.ualberta.ca/content.php?catoid=33&navoid=10017), which include the Registration Add/Drop deadline and Withdrawal date.

**Lecture Schedule & Assigned Readings:**

**Week/Dates****Topic**

1. Jan 11 Introduction, R & Notation, Presenting Data

Jan 13 Understanding Data, Levels of Measurement

1. Jan 18 Descriptive Stats: Central Tendency, Dispersion, Position

Jan 20 Position of Scores, Normal Distribution

1. Jan 25 **Lab 1: Descriptive Statistics**

Jan 27 **Descriptive Statistics Exam** (during class hours)

1. Feb 1 Central Limit Theorem, Random Sampling Distributions

Feb 3 Null Hypothesis Significance Testing, Power, Error

1. Feb 8 z-tests, t-tests, Degrees of Freedom

Feb 10 F-tests, Choosing the right test.

1. *Feb 15 & 17 READING WEEK No Lectures*
2. Feb 22 **Inferential Statistics Exam** (during class hours)

Feb 24 t-tests Theory

1. Mar 1 t-tests in R and Excel, **Lab 2: t-tests**

Mar 3 One-Way ANOVA theory

1. Mar 8 1-way ANOVA in R & Excel, **Lab 3: One-Way ANOVA**

Mar 10 Two-way ANOVAs

1. Mar 15 2-Way ANOVAs in R, **Lab 4: Two-Way ANOVA**

Mar 17 Repeated Measures, Mixed & Factorial ANOVAs

1. Mar 22 R & Excel **Lab 5: RM, Mixed and Factorial ANOVAs**

Mar 24 Correlation and Regression Theory

1. Mar 29 Correlation and Regression in R and Excel, **Lab 6**

Mar 31 Chi-square Theory

1. *Apr 5 Easter Monday No Lecture*

Apr 7 Chi-square in R and Excel **Lab 7: Chi-square**

1. Apr 12 Factor Analysis

Apr 14 Factor Analysis in R **Lab 8: Factor Analysis**

1. TBD Cumulative FINAL EXAM

**Grade Evaluation:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Distribution of Grades** | | | | | | | | | | | | |
| **Letter grade** | A+ | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | F | |
| **% Range** | ≥95 | 90-94 | 85-89 | 80-84 | 75-79 | 71-74 | 67-70 | 63-66 | 60-62 | 55-59 | 50-54 | <50 | |
| **Grade points** | 4.0 | 4.0 | 3.7 | 3.3 | 3.0 | 2.7 | 2.3 | 2.0 | 1.7 | 1.3 | 1.0 | 0 | |
| **Descriptor** | Excellent | | | Good | | | Satisfactory | | | Poor | Minimal Pass | Fail | |
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This table contains an approximate guideline for the course, however the instructor reserves the right to adjust this table and assign appropriate grades based on relative performance.

Grades are unofficial until approved by the Department and/or Faculty offering the course.

**Components of Course Grade:**

**Assessments Weighting Date**

*Descriptive Stats Exam 22.5% Jan 27*

*Inferential Stats Exam 22.5% Feb 22*

*Labs and Assignments 25% Assigned in Class*

*Final Exam 30% (TBD)\**

There is no possibility of a re-examination in this course.

\*WARNING: Students must verify this date on BearTracks when the Final Exam Schedule is posted.

**Format of Tests and Exams:**

The tests will be administered via Moodle/eClass. The tests will incorporate multiple, short answer, long answer, calculation questions as well as uploaded files.

The **Descriptive Statistics** and the **Inferential Statistics exams** will be done during class time and will not require any coding in R (but the option is open for you to check your answers). The exams are closed book, but you will be allowed a formula sheet that you will create yourself.

The **Final Exam** will use Excel and/or R to complete the exam within the allotted time (I normally give out 3 hours for an exam that only takes 2 hours to complete).

**Representative Evaluative Material:**

We will review the exams in class.

**Missed Term Exams and Assignments:**

For an excused absence where the cause is religious belief, a student must contact the instructor(s) within two weeks of the start of Fall or Winter classes to request accommodation for the term (including the final exam, where relevant). Instructors may request adequate documentation to substantiate the student request.

A student who cannot write a term test or complete a term assignment due to incapacitating illness, severe domestic affliction or other compelling reasons must contact the instructor.

Deferral of term work is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of Facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.

In the event that a shift in weighting to the final exam increases its weight to >40%, this does not change the original ‘syllabus weight’, meaning the student does not now qualify for possible re-examination. Transferring the weight of missed work to the final exam could result in the student not being approved for a deferred final examination as they may not have completed the required 50% of term work.

In all cases, instructors may request adequate documentation to substantiate the reason for the absence, at their discretion.

**Deferred Final Examination:** A student who cannot write the final examination due to incapacitating illness, severe domestic affliction or other compelling reasons can apply to their Faculty for a deferred final examination. Students who failed at the start of term to request exam accommodations for religious beliefs are expected to follow the normal deferred final examination process. Such an application must be made to the student’s Faculty office within two working days of the missed examination and must be supported by appropriate documentation or a Statutory Declaration (see Calendar for information on [Attendance](https://calendar.ualberta.ca/content.php?catoid=33&navoid=9816&hl=%22academic+regulations%22&returnto=search#attendance)). Deferred examinations are a privilege and not a right; there is no guarantee that a deferred examination will be granted. Misrepresentation of Facts to gain a deferred examination is a serious breach of the *Code of Student Behaviour*.

**STUDENT RESPONSIBILITIES:**

**Guidelines for Respectful Online Engagement:**

Students from many different backgrounds participate in courses at the University of Alberta. Sexist, racist, homophobic comments and other inflammatory remarks are not conducive to learning in our courses, and absolutely are not permitted. All participants are governed by the [Code of Student Behaviour](https://www.ualberta.ca/governance/resources/policies-standards-and-codes-of-conduct/code-of-student-behaviour.html). Be mindful when discussions involve controversial topics or issues, and consider the possibility that members of our community have themselves experienced some of these issues and/or very different realities because of these issues. Participate in a respectful and considered manner.

If you are witness to or the target of abusive or offensive behaviour in any course, please inform your instructor immediately. You may also contact the Psychology Undergraduate/Graduate Advisor, Associate Chair of Undergraduate/Graduate, or Chair.

**Academic Integrity:** The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the [Code of Student Behaviour](https://www.ualberta.ca/governance/resources/policies-standards-and-codes-of-conduct/code-of-student-behaviour) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All students should consult the [Academic Integrity website](https://www.ualberta.ca/current-students/academic-resources/academic-integrity) for clarification on the various offences. If you have any questions, ask your instructor. All forms of dishonesty are unacceptable at the University. Any offence will be reported to the Associate Dean of the Faculty, who will determine the disciplinary action to be taken. See the [Academic Discipline Process.](https://www.ualberta.ca/provost/dean-of-students/student-conduct-and-accountability/discipline-process) Typical sanctions include conduct probation, a mark reduction or a mark of 0 on an assessment, a grade reduction or a grade of F in a course, a remark on the transcript, and a recommendation for suspension or expulsion from the University of Alberta*.*

All forms of dishonesty are unacceptable at the University. Any offence will be reported to the Associate Dean of Science who will determine the disciplinary action to be taken. Cheating, plagiarism and misrepresentation of facts are serious offences. Anyone who engages in these practices will receive at minimum a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights. As well, in the Faculty of Science the sanction for **cheating** on any examination will include **a disciplinary failing grade** (NO EXCEPTIONS) and senior students should expect a period of suspension or expulsion from the University of Alberta*.*

**Exams:**

Students should refer to the Calendar information on [Conduct of Exams](https://calendar.ualberta.ca/content.php?catoid=33&navoid=9816&hl=%22academic+regulations%22&returnto=search#examinations_exams) for more information.

**Recording and/or Distribution of Course Materials:** Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

**STUDENT RESOURCES:**

**COVID-19 Updates:** Updates pertaining to university-related activities can be found on the [COVID-19 Information website](https://www.ualberta.ca/covid-19/index.html).

**Student Services and Resources:** General information about various services, including academic, financial, health, safety, and career development, can be found on the website for [Current Students](https://www.ualberta.ca/current-students/).

**Accessibility Resources (AR)** (1 – 80 SUB)**:** The University of Alberta is committed to creating work and learning communities that inspire and enable all people to reach their full potential. AR promotes an accessible, inclusive, and universally designed environment. For general information to register for services visit the [Accessibility Resources](https://www.ualberta.ca/current-students/accessibility-resources/index.html) webpage. Eligible students have both rights and responsibilities with regard to accessibility-related accommodations. Consequently, scheduling exam accommodations in accordance with AR deadlines and procedures is essential, and adherence to procedures and deadlines​ is required for U of A to provide accommodations.

**Academic Success Centre** (1-80 SUB)**:** [The Academic Success Centre](https://www.ualberta.ca/current-students/academic-success-centre) provides professional academic support to help students strengthen their academic skills and achieve their academic goals. Individual advising, appointments, and group workshops are available year round in the areas of Accessibility, Communication, Learning, and Writing Resources. Modest fees apply for some services.

**The Centre for Writers** (1-42 Assiniboia Hall)**:** The [Centre for Writers](https://www.ualberta.ca/current-students/centre-for-writers/) offers free one-on-one writing support to students, faculty, and staff. Students can request consultation for a writing project at any stage of development. Instructors can request class visits and presentations.

**First Peoples’ House:** [The First Peoples' House](https://www.ualberta.ca/current-students/first-peoples-house/index.html) provides an environment of empowerment for First Nations, Métis, and Inuit learners to achieve personal and academic growth.

**Health and Wellness Support:** There are many health and community services available to current students. For more information visit the [Health and Wellness Support](https://www.ualberta.ca/current-students/wellness) webpage.

**Office of the Student Ombuds:** The [Office of the Student Ombuds](https://www.ualberta.ca/current-students/ombuds) offers confidential interviews, advice and support to students facing academic, discipline, interpersonal and financial difficulties.

**LEARNING AND WORKING ENVIRONMENT**

The Department of Psychology, Faculty of Arts, and Faculty of Science are committed to ensuring that all students, faculty, and staff are able to work and study in an environment that is safe and free from discrimination, harassment, and violence of any kind. It does not tolerate behaviour that undermines that environment. This includes virtual environments and platforms.

The University of Alberta acknowledges that we are located on Treaty 6 territory, and respects the histories, languages, and cultures of the First Nations, Métis, Inuit, and all First Peoples of Canada, whose presence continues to enrich our vibrant community.

Policy about course outlines can be found in the [Evaluation Procedures and Grading System](https://calendar.ualberta.ca/content.php?catoid=33&navoid=9816&hl=%22academic+regulations%22&returnto=search#evaluation_procedures_and_grading_system) section of the University Calendar.

**Disclaimer:** Any typographical errors in this syllabus are subject to change and will be announced in class and/or posted on the course website (e.g., eClass). The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this syllabus.

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