

PSYC*1010 (Section 02), Course Outline: Winter 2022

General Information

DUE to the ongoing COVID-19 pandemic some courses are being offered virtually and some face to face. This course is offered using a combination of the Alternate-Delivery-Synchronous (AD-S) format and Face-to-Face format. Monday and Friday lectures are delivered virtually at assigned days and times, and Wednesday lectures take place face to face at an assigned location on campus at the set day and time.

Course Title: Making Sense of Data in Psychological Research

Course Description:

This course introduces research designs and quantitative approaches used in psychological science, with an emphasis on conceptual understanding. Specific topics include distributions, meta-analysis, confidence intervals and p-values, effect size, and regression, as well as the differences between descriptive, correlational, and experimental research designs.

The goals of this course are to provide: 1) sufficient knowledge of statistics so that you may critically evaluate claims based a statistical argument; and 2) the statistical tools you need to carry out your own empirical research. The course begins with descriptive statistics (techniques of summarizing or describing research findings) and progresses to inferential statistics (techniques for making predictions about populations based on findings from samples).

Although a significant part of the course entails numerical calculations (you may use a stand-alone calculator, Microsoft Excel, or statistical software), a major aim of the course is to develop an understanding of which statistical procedures are appropriate for different research designs. The statistical procedures are tools that guide researchers' conclusions about research questions. Thus, you will develop critical thinking skills (e.g., ability to analyze and evaluate an argument), and communication skills (e.g., writing, listening, and note-taking skills).

Credit Weight: 0.5

Academic Department (or campus): Psychology

Semester Offering: Winter 2022

Class Schedule and Location:

Monday/Friday 09:30—10:20am (Remote via Zoom)

Wednesday 09:30—10:20am (RICH, Room 2520)

Instructor Information

Instructor Name: Mengyang Qiu

Instructor Email: mqiu02@uoguelph.ca

Office location: TBD

Office hours: Wednesday 1:00-3:00pm (via Zoom) or by appointment

GTA Information

GTA Name: TBD

GTA Email: TBD

GTA office location and office hours: TBD

Course Content

Specific Learning Outcomes:

A. Critical and Creative Thinking

1. Depth and Breadth of Knowledge

- Describe core concepts in the scientific method, research methods and statistics, and indicate how these ideas work together in the scientific method
- Understand and apply key concepts in research methods and statistics as it relates to the scientific method

2. Inquiry and Analysis

- Formulate questions about psychology
- Know how to find relevant evidence
- Evaluate hypotheses based on data
- Recognize the importance of supporting statements with evidence

3. Problem Solving

- Identify issues and creates a plan to address the problem using knowledge of research methods and statistics

B. Literacy

4. Methodological literacy

- Recognize and describe basic research methodologies (e.g., random assignment, random sampling, etc.) and how they work together

5. Quantitative literacy

- Understand the use of numerical data
- Demonstrate ability to interpret data (including formulas)
- Demonstrate ability to analyze data (perform calculations) and interpret data to test a claim
- Use quantitative data as evidence for claim

6. Visual literacy
 - Use graphs, tables and images and visual images and their source
 - Evaluate images and their source (e.g., discerning when a graph is misleading)
- C. Communication
 7. Reading Comprehension (e.g., reading the text materials)
 - Read at a university level, acquiring psychological information
 - Understand sophisticated theoretical and empirical writing in psychology
 8. Listening skills (a component of Oral communication)
 - Determine the key points in an auditory presentation (on the fly) by listening
 - Summarize information in a clear and concise way so that you can later access the information
 - Ask questions of the speaker when you require clarification
 9. Written Communication
 - Explain complex abstract processes in simple, clear, and jargon-free language, presenting ideas in a logical order, using concrete examples, and diagrams, graphs when necessary (see Visual literacy)
 - Write clearly and demonstrates general psychological knowledge when presenting ideas
 - Write using the appropriate vocabulary, presenting statistical results in APA format (American Psychological Association, the standard format for psychological research)
- D. Personal and ethical behavior
 10. Ethical issues in research
 - Describe ethical principles in conducting research as it relates to the accurate (non-misleading) presentation of research results
 11. Personal organization/ time management
 - Deal with intense time pressures, prioritizes and complete important or urgent tasks to schedule, starts task early rather than waiting until the deadline.
 - Cope with time pressures without panicking, by being strategic, and determining a way to get the best results in a limited amount of time.
 - Demonstrate personal accountability and responsibility

For each of the following objectives of this course, the relevant learning outcome is listed afterwards.

On successful completion of this course, you will be able to accomplish the following:

A. Identify and describe key concepts in quantitative psychology, including those relating to the scientific method, research design, and inferential and descriptive statistics. Apply these concepts when solving problems (Learning outcomes: 1, 3- 5, 7-9)

B. Describe the stages involved in scientific reasoning and specify the role and importance of quantification in the scientific method (the scientific reasoning process). Use an example of your own creation to help you explain how this process works. (Learning outcomes: 1, 2, 4, 8-9)

C. Identify the weak points within scientific arguments (places where error can enter), and the places where an individual could lie or mislead using statistics or the graphical (Learning outcomes: 1-6, 8-9)

D. Analyze a research question, identifying the relevant measured and manipulated variables and the scale of measurement for variables. Indicate whether the study is a true experiment, a quasi-experiment, or correlational design and describe the relative strengths and weaknesses of each type of design. (Learning outcomes: 1-3, 7-9)

E. Identify the independent and dependent variables in true and quasi-experiments, being sure to report the measures in terms of how they are measured or manipulated (operational definitions). Identify the relevant variables in a correlational study, describing each variable in terms of how it is measured. (Learning outcomes: 1-5)

F. Describe the differences between descriptive and inferential statistics, indicating when each would be used. Determine the appropriate form of statistical analysis for simple experiments. This involves choosing the correct descriptive and inferential statistic. (Learning outcomes: 1-5, 7-9)

G. Create and graph frequency information (frequency distributions). Calculate measures of central tendency (mean, median, mode) and variability (e.g., range, standard deviation, variance). Explain the meaning and importance of these measures, using jargon-free language and concrete examples of your own creation. (Learning outcomes: 1, 3-9)

H. Interpret information that is presented in graphical format (graphs). Create graphs for frequency distributions, true and quasi-experiments, and correlational studies. (Learning outcomes: 6)

I. Explain what hypothesis testing is, indicating its purposes, the processes involved, and the places where error can enter into the process using jargon-free language and concrete examples of your own creation. Indicate the role of probability in hypothesis testing and inferential statistics. Note: This involves knowing how to define probability and inferential statistics in your own words. (Learning outcomes: 1-9)

J. Carry out hypothesis testing using z-tests, t-tests, and Pearson correlation. (This involves calculating the statistic as well using the result in decisions and presenting the result in writing in APA format). Indicate what statistical significance means and indicate how this is related to effect size and statistical power. Note: This means you will have to be able to describe what each concept means in simple jargon-free language, using a concrete example of your own creation to explain what you mean. (Learning outcomes: 1-9)

K. Describe how statistics can be used to mislead and what honest researchers do to avoid misleading others when presenting data about the results of study. (Learning outcomes: 10)

L. Plan your work across the term so that you complete the assignments on time. Start assignments early so you will not have to rush. Note that steady effort is required, and it is important to create a calendar in advance where you save your deadlines. Deal with time pressures in exams, learning how to prioritize and be strategic in order to make the best of limited time. (Learning outcome: 11).

Lecture Content:

The table below lists the content of the lectures, but lecture dates are tentative. In this class, as in all others, sometimes it takes more time to cover material than expected.

	Week Beginning	Readings
1	January 10	Chapter 1: Sampling and Data
2	January 17	Chapter 2: Descriptive Statistics (2.1 – 2.4)
3	January 24	Chapter 2: Descriptive Statistics (2.5 – 2.7)
4	January 31	Chapter 3: Probability
5	February 7	Chapter 6: The Normal Distribution
6	February 14	Review
7	February 21	No Class (Winter Break)
8	February 28	Chapter 8: Confidence Intervals
9	March 7	Chapter 9: Hypothesis Testing w/ One Sample
10	March 14	Chapter 10: Hypothesis Testing w/ Two Samples
11	March 21	Chapter 13: ANOVA
12	March 28	Chapter 12: Linear Regression and Correlation
13	April 4	Review

Labs: None

Seminars: None

Course Assignments and Tests:

Assignment or Test	Due Date	Contribution to Final Mark (%)	Learning Outcomes Assessed
Assignment 1	By 11:59pm on January 30	5%	1-11
Assignment 2	By 11:59pm on February 13	5%	1-9, 11
Assignment 3	By 11:59pm on March 13	5%	1-9, 11
Assignment 4	By 11:59pm on April 3	5%	1-9, 11
Assignment 5 (Optional)	By 11:59pm on April 10	To replace the lowest/misssed assignment	1-11

Assignment or Test	Due Date	Contribution to Final Mark (%)	Learning Outcomes Assessed
Test 1	Friday February 4 (During class) Chapters 1 & 2	10%	1-11
Test 2	Friday February 18 (During class) Chapters 3 & 6	15%	1-9, 11
Test 3	Friday March 18 (During class) Chapters 8—10	15%	1-9, 11
Test 4	Friday April 8 (During class) Chapters 12 & 13	15%	1-9, 11
Research Design Assignment (5 hours' worth of SONA subject pool credits or written summary of 5 research articles)	By 11:59pm on April 10	5%	1,2,4,11
Final Exam (Cumulative)	April 25 7:00pm – 9:00pm	20%	1-11

Additional Notes (if required):

Assignment 5 is optional, and is used to replace one missed assignment or the one with the lowest score in Assignment 1-4.

Final exam will be cumulative, covering all the topics from the beginning of the term.

Final examination date and time: 7:00pm on April 25 (online exam)

Final exam weighting: 20%

Final Examination regulations are detailed at:

[Examination Regulations](#)

Course Resources

Required Texts:

Illowsky & Dean (2019). Introductory Statistics. OpenStax.

This is a free textbook that can be accessed from the following URL:

<https://openstax.org/details/books/introductory-statistics>

You can read the book online, or download it as a PDF.

Recommended Texts: None

Lab Manual: None

Other Resources:

1. Courselink website (also called D2L). The Courselink website will be used to present online resources, including lecture slides, assignments, and tests.
2. Zoom software. This is online meeting software that is available at no cost to all University of Guelph students. Zoom makes it possible to have face-to-face online interactions as well as present documents for others to view. Links to the Zoom meetings will be posted. Click on the link and then click “Join” to join the meeting.
3. The SONA website. To sign up to participate in an experiment for the Research Participation and Design Assignment, please check the SONA system website. This is the link to [SONA](#). There is information there on that website about how to get into a SONA experiment and there is also information about the articles and how to hand in the alternative assignments (the written summaries of the articles). To log into Sona, you must enter the first page of the website and click the green button that says “University of Guelph SSO Log In.” Clicking this green button will lead you the University of Guelph central login window, where you will need to enter your central login information. As a reminder, your username is your University of Guelph email address without including the “@uoguelph.ca” and your password is the same password you use to access Courselink. If you have questions about the login process, please email ppadmin@uoguelph.ca.

Field Trips: None

Additional Costs: None

Course Policies

Lectures will serve to introduce concepts and calculations relevant to the outlined course material. There will usually be a fair amount of material to cover each lecture, and so the lecture will not be the place where you should expect to have the opportunity to practice the calculations on your own. Some of the lecture material is not in the text and there will be questions from lecture on exams. You are responsible for material in the lecture as well as the text.

Grading Policies

Undergraduate Grading Procedures

1. Noncumulative tests. There will be 4 noncumulative exams, which will contribute 55% to your final grade (Exam 1: 10%; Exams 2-4: 15% each). These timed and open book/note exams will be given during regular class time, and consist of topics covered in the previous lectures and assignments (see schedule for details). These exams may include multiple

choice, fill-in the blank, short answer, and calculations. You will not be expected to memorize all the statistical formula used in the course, and instead focus on identifying which of several alternative statistical approaches is appropriate to the problem at hand.

2. Cumulative final exam. There will be one cumulative final exam, which will contribute 20% to your final grade. It will be scheduled during the finals period. Similar to the noncumulative tests, it will be timed and open book/note, and contain the same question types. Given its cumulative nature, the final exam will be longer than the noncumulative tests.

Note that each student must take all the five exams. In the event that you miss an exam due to illness or serious personal issues, a makeup exam will be rescheduled for you within 13 days of the original exam. (It is your responsibility to inform the instructor if you miss an exam and he will then make the arrangements for the makeup exam.) In most cases, make-up exams occur during office hours the week following the exam. If you feel that an exam question has been mis-marked, the instructor would be happy to mark the exam again for you if you ask. (Your mark may not necessarily go up but he will provide detailed comments to explain what went wrong in efforts to help you for next exam.) If you are having trouble with exams, please see the instructor. He would be happy to go over your exam with you, point-by-point, and help you work out a strategy about how you can do better on exams.

3. Assignments. The purpose of these assignments is to assist in your preparation for an upcoming exam. Thus, their focus will be on material from the previous lectures and that will appear on the forthcoming exam. The assignments are structured similarly to the exam that will follow. This feature makes these assignments an especially good way to assess your own understanding of the material for the upcoming exam. Things that you are having difficulty with for the assignment will also pose a problem for you on the exam and you should consider getting help from the instructor, TAs, or a peer who is doing well in the class. The four assignments are collectively worth 20% of your final grade (5% each). There is also an optional fifth assignment. You can choose to complete it to replace one missed assignment or the one with the lowest score in Assignment 1-4.
4. Research participation and design assignments. One of the best ways to learn about research is to participate, and in particular, there are special benefits for quantification students because participation will give you a chance to see how the concepts of this course are applied in actual research projects that are being carried out at the University of Guelph. Furthermore, if you choose to continue on in Psychology, you may one day be carrying out your own research as part of an undergraduate honours thesis, research internship, or research project. Consequently, you may enjoy talking to more senior students in the Psychology program, either upper year undergraduate students, graduate students, or research interns/assistants. In this course, you may learn up to 5% for participating in the psychological studies occurring in the department (these are advertised in the SONA network). Your assignment is to participate in this experiment, and afterwards you will need to read the debriefing sheet to find out for yourself the answers to the following questions:

- a. What is the research question for this study? Why is it important to know about this? (For example, what are the real-life ramifications of this study?)
- b. What variables are the researchers investigating? (List the independent and dependent variables or in correlational designs, the measured variables.)
- c. What type of design does this study have? (True experiment, quasi-experiment, and correlational design)

Notice: If you participate in a study, you do not have to write anything or turn it in. I would just like you to think about these issues as you do the study so you can benefit from your experience maximally. (The experience of being in a study should give you some real-life experience with some of the concepts we are discussing in class.)

There are also options for those who choose not to participate in a study. If you are not interested in participating in a study or if there are no studies available on the SONA network, you may also choose the option of reading published journal articles that will be made available on the SONA website (address listed below). Specifically, for each of the 5 credits participation time, you will need to read one of the articles on Courselink and write summary for each in the format described under "Alternative Assignment" tab on the SONA website, making sure that in your summary you also mention the answers to each of the four questions listed above. Note: These must be written in your own words, not ones from the article or ones written by your classmates. Plagiarism and cheating are regarded as academic misconduct. For further information, see the section on academic misconduct.

Thus, there are two types of research participation and design assignment: those based on actual research participation and those based on reading published articles on Courselink and writing the required summary. Many of you will find that you end up doing both types of assignment to make up your 5% for the Research Participation and Design Assignment mark. For example, you may have 3% based on participation in 3 hours-worth of experiments and another 2 % on summaries from 2 of the articles posted on the SONA website. All research participation and design papers are due by no later than midnight on the last day of scheduled classes. It is a good idea to spread these out over the term to prevent you from being overwhelmed at the end of the year. (This is where planning and time management enters in.)

To sign up to participate in an experiment, check the [SONA](#) system website. There is information there on that website about how to get into a SONA experiment and there is also information about the articles and how to hand in the alternative assignments (the written summaries of the articles).

Course Policy on Group Work:

Each student is expected to complete assignments and tests on his or her own. There is little benefit to parroting the answer of some other student word-for-word (or for that matter the textbook or another source) and if there is evidence that students are doing this it will be dealt with as per the regulations on Academic Misconduct. However, that does not mean that students cannot form study groups. However, it is important that everyone in the end does his

or her own work so that each of you can perform well on the exams.

Course Policy regarding use of electronic devices and recording of lectures:

Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted, they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

University Policies

Disclaimer:

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email. This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

Academic Consideration

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id#, and e-mail contact. See the academic calendar for information on regulations and procedures for Academic Consideration: [Academic Consideration, Appeals and Petitions](#)

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar: [Academic Misconduct Policy](#)

Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact [Student Accessibility Services](#) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 54335 or email accessibility@uoguelph.ca or the [Student Accessibility Services Website](#)

Student Feedback Questionnaire

These questionnaires (formerly course evaluations) will be available to students during the last 2 weeks of the semester: March 28th – April 08th. Students will receive an email directly from the Student Feedback Administration system which will include a direct link to the questionnaire for this course. During this time, when a student goes to login to CourseLink, a reminder will pop-up when a task is available to complete.

[Student Feedback Questionnaire](#)

Drop date

The last date to drop one-semester courses, without academic penalty, is April 08, 2022. For regulations and procedures for Dropping Courses, see the [Schedule of Dates in the Academic Calendar](#). [Current Undergraduate Calendar](#)

Additional Course Information

This course requires the use of Respondus LockDown Browser and Monitor (webcam) for proctoring within CourseLink. You must [download and install LockDown Browser and Monitor](#) to complete the practice test (highly recommended; not graded) and course exams. The purpose of the practice test is to ensure that Respondus LockDown Browser and Monitor is set up properly and that you are comfortable using the software.

Respondus LockDown Browser is a locked browser connected to the Quizzes tool in CourseLink. It prevents you from printing and copying, using other operating software, using search engines (e.g., going to another URL), communicating via instant messaging, and it blocks non-web-related software (e.g., Adobe PDF, Microsoft Word).

Respondus Monitor is a companion application for LockDown Browser that uses webcam and video technology to ensure academic integrity during online exams. The software captures video during the exam and allows the instructor to review the video once the exam is completed.

In order to use Respondus LockDown Browser and Monitor, you must meet the [technical requirements](#). Visit the Remote Learning website for guidance on [preparing your online exam environment](#).

If you have any concerns about meeting system requirements, contact [CourseLink Support](#). They will work with you to find alternative solutions or make alternative arrangements.