

FRAN*6000 Quantitative Research Methods

COURSE OUTLINE – WINTER 2026

1. GRADUATE CALENDAR DESCRIPTION

This course includes critical appraisal of the research literature. Research ethics, subject selection, measurement issues, survey design, experimental and quasi-experimental designs, cross-sectional and longitudinal designs, scale development, questionnaire development and sampling strategies are discussed.

Credit Weight: 0.5 credits

Course Hours: 3-0 (36 lecture; 0 lab/seminar)

Pre-Requisite(s):

Co-Requisites(s):

Restriction(s):

2. COURSE DESCRIPTION

This course is designed to provide you with a conceptual understanding of the issues and methods related to the development and implementation of quantitative research. The course entails critical appraisal of the research literature. To make the course more relevant to you, I have assigned readings from various academic disciplines and your assignments can address a general research topic of your choice.

3. TIMETABLE

Lecture:

Location:

4. INSTRUCTIONAL SUPPORT

Course Instructor: Brian Lo, PhD, MPH, RD

Email: blo02@uoguelph.ca

Telephone: 519-824-4120 ext. 52419

Office: Macdonald Institute (MINS) 215

Office Hours: By appointment

5. LEARNING RESOURCES

Required Resource(s):

Gliner, G. A., Morgan, George, A., & Leech, N. L. (2016). Research Methods in Applied Settings. New York, NY: Routledge Taylor & Francis Group. Free e-copies are available via University of Guelph Library. Retail price: approx. \$120 USD.

Additional readings uploaded to CourseLink or available from the University of Guelph Library. There are no restrictions on using a second-hand copy of the textbook.

Recommended Resource(s):

It is your responsibility to ensure that you currently have a basic / fundamental knowledge of research methods, which serves as the foundation for this higher-level, graduate research methods course. If necessary, you can refer to an applied research methods textbook to review some content in a previous undergraduate research methods course.

Books that emphasize applied research methods:

- Creswell, John W. & Creswell, J. (2022). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (6th Ed). Thousand Oaks, CA: Sage Publications. Available via University of Guelph Library. Retail price: approx. \$130 CAD.

G*Power is software to calculate statistical power. Available to download free at

<http://www.gpower.hhu.de/en.html>

6. LEARNING OUTCOMES

At the completion of the course, successful students will be able to:

1. Develop conceptual and operational definitions of constructs commonly used in research.
2. Describe a range of quantitative research designs used in their field of research and identify the advantages and disadvantages associated with these designs.
3. Critique survey questions based on principles of survey design.
4. Apply principles of measurement about establishing the validity and reliability of existing and new measures.
5. Develop specific research designs to examine various research objectives or hypotheses.
6. Assess ethical issues in empirical research.
7. Critically appraise research described in peer-reviewed journal articles.
8. Identify strategies for successfully navigating aspects of academia and professional life (publishing, project management, knowledge mobilization).
9. Communicate effectively (in both writing and oral presentation) about scientific research.
10. To gain proficiency in facilitating and participating in informed discussion about quantitative research methods.

7. TEACHING AND LEARNING ACTIVITIES/CLASS SCHEDULE

Week	Topics, Assigned Readings & Guest Speakers	Notes & Due Dates
1 Wed. Jan 7	<p>Introduction: Why are we here?</p> <p>I will describe the course, ask each of you about your research interests and goals, then we will discuss key features of quantitative research methods. In particular, this class focuses on quantitative methods. Before we go into the components of those methods, we should first learn about the logic and assumptions behind them, and the importance of theories and research.</p> <p>Readings: Textbook Chapters 1 & 4</p>	
2 Wed. Jan 14	<p>Developing Research Questions & Hypotheses</p> <p>Now that we have discussed why we go through the effort of quantifying things, we will spend today talking about how to develop research questions and turn your grand ideas into testable hypotheses.</p> <p>Textbook Readings: Chapters 2 & 3</p> <p>Contemporary Discourse Readings: Watts DJ. Should social science be more solution-oriented? <i>Nature Human Behaviour</i>. 2017;1(1):0015.</p> <p>Scheel AM, Tiokhin L, Isager PM, Lakens D. Why hypothesis testers should spend less time testing hypotheses. <i>Perspectives on Psychological Science</i>. 2021;16(4):744-755.</p>	Reaction paper due Wed (Jan 14) at 8:30am

Week	Topics, Assigned Readings & Guest Speakers	Notes & Due Dates
3 Wed. Jan 21	<p>Sampling Part 1: Who are you studying? How many people do you need?</p> <p>Now that you know what you are interested in studying, we will discuss how you might go about selecting your sample for study, and how many people you will need to reach.</p> <p>Workshop topic: Sample Size Analysis (10am) Lindsay Plater, PhD Data Analyst II, McLaughlin Library, University of Guelph</p> <p>Textbook Readings: Chapters 8 & 9</p> <p>Contemporary Discourse Readings: MacInnis B, Krosnick JA, Ho AS, Cho MJ. The accuracy of measurements with probability and nonprobability survey samples: Replication and extension. <i>Public Opinion Quarterly</i>. 2018;82(4):707-744.</p> <p>Kenny DA, Judd CM. The unappreciated heterogeneity of effect sizes: Implications for power, precision, planning of research, and replication. <i>Psychological Methods</i>. 2019;24(5):578.</p>	Reaction paper due Wed (Jan 21) at 8:30am
4 Wed. Jan 28	<p>Sampling Part 2: How are you going to recruit your sample?</p> <p>Now that you know who you want to participate in your study (and how many you will need), you will need a plan for recruiting them.</p> <p>Student discussion: Recruitment Planning and Associated Trade-offs</p> <p>Workshop topic: Research Data Management Workshop (10am) Lucia Costanzo Research and Scholarship Librarian, University of Guelph</p> <p>Contemporary Discourse Readings: D'Alonzo KT. Getting started in CBPR: lessons in building community partnerships for new researchers. <i>Nursing Inquiry</i>. 2010;17(4):282-288.</p> <p>Safi AG, Reyes C, Jesch E, Steinhardt J, Niederdeppe J, Skurka C, Kalaji M, Scolere L, Byrne S. Comparing in person and internet methods to recruit low-SES populations for tobacco control policy research. <i>Social Science & Medicine</i>. 2019;242:112597.</p>	Reaction paper due Wed (Jan 28) at 8:30am

Week	Topics, Assigned Readings & Guest Speakers	Notes & Due Dates
5 Wed. Feb 4	<p>Ethics in Social Science Research</p> <p>Before we dive into how to do research, we must discuss ethics. There are many things we can do, but it is worth spending some time thinking about whether we should. It is critical to consider ethics at every step, from developing an idea to publishing and disseminating it.</p> <p>Textbook Reading: Chapter 14</p> <p>Workshop Topic: Author rights, Copyright, and Publishing (10am) Nicole Slattery Research and Scholarship Librarian, University of Guelph</p> <p>Contemporary Discourse Readings: Crooks N, Donenberg G, Matthews A. Ethics of research at the intersection of COVID-19 and black lives matter: A call to action. <i>Journal of Medical Ethics</i>. 2021;47(4),205-207.</p> <p>Harden, P. (2021). What do we do with the science of terrible men? Retrieved from: https://aeon.co/essays/what-do-we-do-with-the-science-of-terrible-men</p> <p>REB Reading: https://tcps2core.ca/welcome</p>	<p>Reaction paper due Wed (Feb 4) at 8:30am</p> <p>Article choice due for the Renovate This Study Project (Feb 4) at 23:59pm</p>
6 Wed. Feb 11	<p>Measurement Reliability & Validity:</p> <p>For this week, we will talk about measurement reliability and validity. We will also examine different ways to test measurement instruments' reliability and validity.</p> <p>Textbook Readings: Chapters 11, 12 & 15 (data reduction section)</p> <p>Contemporary Discourse Readings: Grigoropoulou N, Small ML. The data revolution in social science needs qualitative research. <i>Nature Human Behaviour</i>. 2022;6(7):904-906.</p> <p>Jones-Roy, A. (2019, July 24). I'm a data scientist who is skeptical about data. Retrieved from: https://qz.com/1664575/is-data-science-legit</p>	<p>Reaction paper due Wed (Feb 11) at 8:30am</p>

Week	Topics, Assigned Readings & Guest Speakers	Notes & Due Dates
7 Wed. Feb 25	<p>Survey research</p> <p>Survey research is a common approach in the field of quantitative research. For this week, we will talk about things that we need to consider in implementing survey research and the things we need to consider when building a survey instrument.</p> <p>Textbook Readings: Chapter 7, 13</p> <p>Content-related Readings: https://psr.iq.harvard.edu/files/psr/files/PSRQuestionnaireTipSheet_0.pdf</p> <p>https://osteopathic-medicine.uw.edu/_docs/getting-started-research/survey-fundamentals.pdf</p> <p>Contemporary Discourse Readings: Skinner N, Roche A. Why are you asking about gender? Negotiating survey research methods within an industry collaboration. <i>Public Health in Practice</i>. 2021;2:100137.</p> <p>Leeper TJ. Where have the respondents gone? Perhaps we ate them all. <i>Public Opinion Quarterly</i>. 2019;83(S1):280-288.</p>	<p>Reaction paper due Wed (Feb 25) at 8:30am</p>
8 Wed. Mar 4	<p>Intervention study designs</p> <p>We will talk about different types of intervention designs this week, highlighting some of the strengths and limitations. We will also touch on process evaluation.</p> <p>Textbook Reading: Chapter 5</p> <p>Content-related Reading: Aggarwal R, Ranganathan P. Study designs: Part 4–interventional studies. <i>Perspectives in Clinical Research</i>. 2019;10(3):137.</p> <p>Contemporary Discourse Reading: Deaton A, Cartwright N. Understanding and misunderstanding randomized controlled trials. <i>Social Science & Medicine</i>. 2018;210:2-21.</p>	<p>Reaction paper due Wed (Mar 4) at 8:30am</p>

Week	Topics, Assigned Readings & Guest Speakers	Notes & Due Dates
9 Wed. Mar 11	<p>Observational Research: Flipped Classroom Day 1 (2 presentations)</p> <p>When tightly controlled studies are impossible or unethical, we must use other methods. Some of these alternatives are better than others. This week, we will have you to talk about some observational studies or your choice. More information will be provided in class.</p>	<p>Flipped Classroom Activity slides due (Mar 11) at 23:59pm</p> <p>Deconstruction due for the Renovate This Study Project (Mar 11) at 23:59pm</p>
10 Wed. Mar 18	<p>Observational Research: Flipped Classroom Day 2 (2 presentations)</p> <p>When tightly controlled studies are impossible or unethical, we must use other methods. Some of these alternatives are better than others. This week, we will have you to talk about some observational studies or your choice. More information will be provided in class.</p>	<p>Flipped Classroom Activity slides due (Mar 18) at 23:59pm</p>
11 Wed. Mar 25	<p>Review studies – pre-recorded session.</p> <p>We have talked about different quantitative research approaches. In this week, we will talk about several ways to quantitatively synthesize research findings.</p> <p>In Young Park, MSW PhD Postdoctoral Fellow, Boston College School of Social Work</p> <p>Content-related Readings: Munn Z, Peters MD, Stern C, Tufanaru C, McArthur A, Aromataris E. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. <i>BMC Medical Research Methodology</i>. 2018;18(1):1-7.</p> <p>Review Methodology Decision Tree by Cornell University</p> <p>Contemporary Discourse Readings: Silberzahn R, Uhlmann EL, Martin DP, Anselmi P, Aust F, Awtrey E, Bahník Š, Bai F, Bannard C, Bonnier E, Carlsson R. Many analysts, one data set: Making transparent how variations in analytic choices affect results. <i>Advances in Methods and Practices in Psychological Science</i>. 2018;1(3):337-56.</p> <p>Sheagley G, Clifford S. No evidence that measuring moderators alters treatment effects. <i>American Journal of Political Science</i>. 2023.</p> <p>Work session day!</p>	<p>Reaction paper due Wed (Mar 25) at 8:30am</p>

Week	Topics, Assigned Readings & Guest Speakers	Notes & Due Dates
12 Wed. Apr 1	Student presentations in pairs or solo – Renovate This Study Student presenters	Presentation slides due for the Renovate This Study Project (Apr 1) at 23:59pm Renovate & Reveal due for the Renovate This Study Project (Apr 6) at 23:59pm Engagement self-reflection due (Apr 6) at 23:59pm

Note: This is a tentative schedule; however, due to various unknown factors there may be changes.

Any changes will be announced during class and an announcement will be posted on the CourseLink site.

8. ASSESSMENT DETAILS

Assessment	LOs Addressed	Due Date	% of Final
Reaction Papers (8 papers; 2.5 points each)	1, 8	8:30am; see course schedule above	20
Renovate This Study Project		Wednesdays at	
• Choosing a Study	7	Feb 4	Not graded
• Deconstruction	1, 2, 3, 4, 6, 7	Mar 11	15
• Renovate & Reveal	1, 2, 3, 4, 5, 9	Apr 6	20
• Presentation	9, 10	April 1	10
Flipped Classroom Activity	1, 2, 9, 10	Mar 11/18	15
Participation in class discussions and self-reflection on engagement	10	Throughout; Self-reflection due on Apr 6	20
Total:			100%

Acknowledgement: This course outline is partially based on Cornell University's COMM 6820 Quantitative Research Methods course taught by Dr. Neil A. Lewis, Jr. and Dr. Andrea Stevenson Won.

9. COURSE STATEMENTS

Land Acknowledgement:

We acknowledge that the University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer our respect to our Anishinaabe,

Haudenosaunee and Métis neighbours as we strive to strengthen our relationships with them. Acknowledging them reminds us of our important connection to this land where we learn and work.

Course Website:

There is a course website at <http://courselink.uoguelph.ca>. All components of this course will be housed on the CourseLink site including this course outline, assignments, and links to further resources. Your assignments will be submitted through the Dropbox function. Marks and feedback will also be released on the site. Please familiarize yourself with this website as soon as possible and visit it regularly throughout the semester.

Late Assignments:

Late assignments will be accepted up to 5 days following the due date and will receive a penalty of 10% per day EXCEPT under documented grounds for compassionate consideration. Assignments submitted more than one week late without documented grounds will receive a grade of zero. If you are going to hand an assignment in late, you must contact your course instructor to inform them when you will be submitting your assignment. **Please note that late submissions for the Weekly Reaction Papers are not accepted.**

Receipt of Grades:

After you receive a grade on CourseLink, please review your feedback. Any inquiry or dispute over the grade must be made within two weeks from the date they are posted. If you fail to protest any grade during this time limit, changes to the grade will not be considered.

Turnitin Software:

In this course, your instructor will be using Turnitin, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph.

All submitted assignments will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

A major benefit of using Turnitin is that students will be able to educate and empower themselves in preventing academic misconduct. In this course, you may screen your own assignments through Turnitin as many times as you wish before the due date. You will be able to see and print reports that show you exactly where you have properly and improperly referenced the outside sources and materials in your assignment.

10. UNIVERSITY STATEMENTS

E-mail communication:

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When you cannot meet a course requirement:

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Graduate Calendar for information on regulations and procedures for [Academic Consideration](#).

Drop date:

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for [Dropping Courses](#) are available in the Graduate Calendar.

Copies of out-of-class assignments:

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility:

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

More information: www.uoguelph.ca/sas

Academic misconduct:

The [Academic Misconduct Policy](#) is outlined in the Graduate Calendar.

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.

Instructors **shall not** determine if academic misconduct has occurred. This is up to the Associate Dean Academic's office. Instructors shall not assign a grade of zero even if they believe that the student has committed some form of academic misconduct (e.g., copied material from a website like CourseHero) on an assignment or exam.

Instructors **can** determine if a student has poorly paraphrased and/or improperly cited material and can provide a grade accordingly as long as this is clearly identified as part of the assessment criteria via a rubric or other assessment tools.

For more information about Academic Integrity resources and how to prevent Academic Misconduct see: <https://csahs.uoguelph.ca/faculty-research/hub-teaching-learning-excellence/academic-integrity>

Recording of materials:

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources:

The [Academic Calendars](#) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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.

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).

COVID-19 Safety Protocols:

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/>

- <https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces>

Please note, that these guidelines may be updated as required in response to evolving University, Public Health or government directives.