

ECON 2P91: Business Econometrics with Applications

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Class Times

Section 1: Tuesdays, 6pm-9pm, TH242

Section 2: Mondays, 2pm-5pm, TH242

Lab Times

Tutorial 1: Mondays, 11am-12pm, GLA164

Tutorial 2: Wednesdays, 8am-9am, ST108

Tutorial 3: Fridays, 11am-12pm, ST107

Tutorial 4: Wednesdays, 10am-11am, EA102

Tutorial 5: Thursdays, 10am-11am, STH216

Tutorial 6: Thursdays, 1am-2pm, MCH313

Registration & Prerequisites

You are responsible for ensuring that you are registered in the correct courses. If you notice a problem with your registration, contact your academic councillor right away.

The prerequisites for this course are ECON 1P91, 1P92, MATH 1P97 and MATH/STAT 1P98. Please note that you are responsible for ensuring that you have successfully completed all course prerequisites. The lack of prerequisites will not lead to any preferential treatment and may not be used as basis for appeal.

Course Description

This course is centered around giving you the tools to make you serious, thoughtful, and skeptical consumers of quantitative information. The goal isn't to make you an expert in statistics, but rather to give you the tools to understand and evaluate quantitative information.

We will cover the basics of correlation and causation—what they are, how they differ, and what are they good for—in plain language. Once we have this foundation, we can start looking at how we can tell whether correlations exist and how we can trick ourselves if we're not careful. Then, we can start thinking about whether or not a relationship is causal, why it's so important to uncover causal relationships, what pitfalls there are, and how we might try to overcome them. Finally, we'll look at some of the ways we can use the kinds of quantitative information we've learned how to generate earlier to make informed decisions and what kinds of limitations we should have in mind when doing so. Throughout the course, we'll also be using the statistical software package R to do some of the heavy lifting for us.

I know that not all of you will want to become economists, data analysts, or other professionals that heavily feature first hand use of regressions but as business students, you will be exposed to quantitative information in your careers and be asked to make decisions based on it. This is also true of your personal lives. The goal of this course is to give you the tools to better understand and evaluate that information more thoughtfully.

Course Objectives

By the completion of this course, you should be able to:

1. Explain correlation and causation, and the difference between them;
2. Establish whether or not a correlation, causal or not, exists between features of the world;
3. Understand the importance of causality for making policy and interventions, describe challenges to establishing causality and tools for tackling these challenges;
4. Use quantitative information to make informed decisions;
5. Apply data analysis skills using the statistical software package R.

Materials

The required textbook for this course is **“Thinking Clearly with Data” by Bueno de Mesquita, E. and Fowler, A., 2021**. This book is available at the campus bookstore.

We will be using the **free** statistical software R in this course. Detailed software requirements and instructions will be posted on the course webwebsite. The go-to reference on the tidyverse in R is Wickham, H. and Grolemund, G., “R for Data Science: Import, Tidy, Transform, Visualize, and Model Data”, 2017. It is available for free online: <https://r4ds.had.co.nz/>

The R labs may draw on material from Alexander, R., “Telling Stories with Data”, which is freely available: <https://tellingstorieswithdata.com/>.

Labs

“Computer labs” will be held most weeks (starting week 2 and not during Reading Week, or Midterm week). These labs will be led by your TA and will be where you learn how to use R. Please ensure to attend the labs regularly.

Evaluation

You (the student) and I (the instructor) should care the most about what you *learn*, not what numerical/letter summary of that learning you get at the end of the semester. So while I would love to not have grades at all, unfortunately we humans are very good at procrastinating on our good intentions when there is no incentive not to. So, we have grades to help solve this commitment problem and to encourage you to put effort into learning the course material. The course grade will be based on completing R tutorials, weekly problem sets, three assignments, a midterm, and a final exam.

The distribution of the grades is as follows:

Item	Weight	Date
Midterm	25%	Week 07, 10/23 - 10/27
Final	35%	TBD
Weekly Problems	10%	Every Friday @ 11:59PM
Assignment 1	10%	Week 04, 10/02 - 10/06
Assignment 2	10%	Week 09, 11/06 - 11/10
Assignment 3	10%	Week 13, 12/04 - 12/08

The weekly problems will be posted on the course website and will be marked based on completeness and whether a reasonable effort was made. Some of these may involve using R. They will be due Fridays at 11:59PM ET. There are no weekly problems due during Reading Break or during the week of the Midterm. Late problem set submissions will not be accepted.

The assignments are more involved than the weekly problems and will involve using R. It is a good idea to install R early on in the semester and start on the assignments as soon as possible to make getting help with any coding issues easier. Assignments will be posted on the course website and will be due on the dates indicated on the course schedule. Late assignments will not be accepted.

The midterm exam will be held during class time. The final is comprehensive. The material for the midterm and final exams comes from topics covered in the lectures, the weekly problems, and assignments (and for the final exam, material from the midterm).

There will be no make-up exams. In extraordinary, documented circumstances, the marks allocated to a missed midterm or assignment may be redistributed.

The weekly problems and assignments are there to help you work through the material consistently throughout the semester and will put you in a better position for the midterm and final exams. Think of it as getting marks for studying as long as you bring receipts. **The course material builds on what came before, so cramming is not an effective strategy.** If you are having trouble with the material, please come to drop-in hours or make an appointment to see me.

Academic Honesty

The work that you do in both the weekly problems and assignments should be your own work. You may seek help from others so long as this does not result in someone else completing your work for you. You should never copy and paste code from another student or elsewhere (e.g., websites, former students).

I also strongly suggest that you make a solo effort at all the problems before consulting others. The exams will be very difficult if you have no experience working on your own. There is no collaboration allowed on the exams.

University Academic Integrity Statement

Academic misconduct is a serious offence. The principle of academic integrity, particularly of doing one's own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should consult Section VII, "Academic Misconduct", in the "Academic Regulations and University Policies" entry in the Undergraduate Calendar, available at <http://brocku.ca/webcal> to view a fuller description of prohibited actions, and the procedures and penalties. Information on what constitutes academic integrity is available at <https://brocku.ca/academic-integrity/>

Special Accommodation

The University is committed to fostering an inclusive and supportive environment for all students and will adhere to the Human Rights principles that ensure respect for dignity, individualized accommodation, inclusion and full participation. The University provides a wide range of resources to assist students, as follows:

- a) If you require academic accommodation because of a disability or an ongoing health or mental health condition, please contact Student Accessibility Services at askSAS@brocku.ca or 905 688 5550 ext. 3240.
- b) Medical Self-Declaration Form (short-term) In the case of a short-term medical circumstance, if a student wishes to seek an academic consideration, please use the Medical Self-Declaration Form. The request is to be made in good faith by the student requesting the academic consideration due to a short-term condition that impacts their academic activities (e.g., participation in academic classes, delay in assignments, etc.). The period of this short-term medical condition for academic consideration must fall within a 72-hour (3 day) period. The form needs to be submitted to the instructor either during your brief absence or in cases where you are too unwell, within 24 hours of the end of your 3 day brief absence. Medical Verification Form (extended duration) In cases where a student requests academic consideration due to a medical circumstance that exceeds 72 hours (three days) and will impact their academic activities (e.g., participation in academic classes, delay in assignments, etc.), or in the case of a final exam deferral, the medical verification form must be signed by the student and the health professional as per process set out in the Faculty Handbook III:9.4.1.
- c) If you are experiencing mental health concerns, contact the Student Wellness and Accessibility Centre. Good2Talk is a service specifically for post-secondary students, available 24/7, 365 days a year, and provides anonymous assistance: <http://www.good2talk.ca/> or call 1-866-925-5454. For information on wellness, coping and resiliency, visit: <https://brocku.ca/mental-health/>
- d) If you require academic accommodation on religious grounds, you should make a formal, written request to your instructor(s) for alternative dates and/or means of satisfying requirements. Such requests should be made during the first two weeks of any given academic term, or as soon as possible after a need for accommodation is known to exist.
- e) If you have been affected by sexual violence, the Human Rights & Equity Office offers support, information, reasonable accommodations, and resources through the Sexual Violence Support & Education Coordinator. For information on sexual violence, visit Brock's Sexual

Assault and Harassment Policy or contact the Sexual Violence Support & Response Coordinator at humanrights@brocku.ca or 905 688 5550 ext. 4387.

- f) If you feel you have experienced discrimination or harassment on any of the above grounds, including racial, gender or other forms of discrimination, contact the Human Rights and Equity Office at humanrights@brocku.ca.

Class Schedule

Date	Topic	Chapter
Week 01, 09/11 - 09/15	Introduction, Syllabus, & R	1
Week 02, 09/18 - 09/22	Correlation & Causation	2 & 3
Week 03, 09/25 - 09/29	Correlation & Regression	4 & 5
Week 04, 10/02 - 10/06	Statistical Inference & Comparing	6 & 7
Week 05, 10/09 - 10/13	Reading Break	
Week 06, 10/16 - 10/20	Reversion to the mean & Causality Redux	8 & 9
Week 07, 10/23 - 10/27	Midterm	
Week 08, 10/30 - 11/03	Confounders & Experiments	10 & 11
Week 09, 11/06 - 11/10	Regression Discontinuity	12
Week 10, 11/13 - 11/17	Difference-in-Differences	13
Week 11, 11/20 - 11/24	Mechanisms & Substance	14 & 15
Week 12, 11/27 - 12/01	Measurement & Limits	16 & 17
Week 13, 12/04 - 12/08	Overflow & Review	

Weeks **4**, **9**, and **13** are in **Pine Green** to indicate assignment due dates. Weeks **5** and **7** are in **Brick Red** to indicate Reading Break and the Midterm.

Note that additional topics may be added or some of the above topics may be deleted or revised. Material may be covered in a different order. Students are reminded that attending lectures and keeping abreast of all changes to the course curriculum is their responsibility.

Acknowledgements

I'd like to thank Matt Blackwell, Florian Hollenbach, Ethan de Mesquita, and Andrew Fowler for materials that helped create this course.