



Faculty of Science Course Syllabus

Department of Economics

Econometrics I, ECON 3338

Fall 2024

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Instructor

Nicholas Lawson, nicholas.lawson@dal.ca

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Phone: 902-494-6987

Office Hours: Tuesdays, 10:30 am-11:45 am (or by appointment)

Teaching Assistant

Mingyue Li, mn905298@dal.ca

Office Hours: TBD

Timetable

Lectures: Tuesdays & Thursdays, 1:05 pm-2:25 pm, Dunn 304

Tutorials: Thursdays, 11:35 am-12:55 pm, McCain 2019

Communication

When I need to communicate information to you all, I will send an email to the class through Brightspace. You are responsible for checking your email account so as not to miss important messages. To contact me, send an email to nicholas.lawson@dal.ca, with "ECON 3338" in the subject, and I will respond within 24 hours (except weekends). I also make in-class announcements at the start of each class. I will be available to meet with students in my office during my office hours, but you can also contact me by email at any time, and I will also be available for meetings at other times by appointment, in my office or on Teams.

Course Description

The theory of some quantitative methods commonly used by economists is discussed in the context of the classical linear model. Estimation problems caused by violations of the assumptions of the classical model are studied including heteroscedasticity and autocorrelation.

Course Prerequisites

MATH 1000.03 (or equivalent) and STAT 2060.03/MATH 2060.03 with minimum grades of C.

Course Objectives

Students will acquire a good understanding of the fundamental principles of econometrics, including knowledge of various econometric techniques designed to ensure reliable quantitative analysis of economic questions and data. They will gain experience working with real-world data, building econometric models, and performing hypothesis testing. The objectives of the course are that the participants can:

- formulate the simple and multiple linear regression models and their underlying assumptions
- apply the procedure of Ordinary Least Squares
- estimate and interpret the parameters of linear regression models
- describe the statistical properties of the estimated parameters
- test linear restrictions imposed on the parameters of linear regression models
- use the estimated regression model to compute forecasts and to interpret the precision of these forecasts
- understand the consequences of multicollinearity, omitted variables, functional form misspecification, and heteroskedasticity in multiple regression models
- evaluate the adequacy of the estimated regression models by performing specification tests
- estimate models with binary dependent variables.

Course Organization

The course combines theoretical and applied elements: in my lectures, I will concentrate on the foundations of econometric theory, using my own slides, with some exercises as examples. In the tutorials, the TA will present algebraic and numerical exercises, as well as empirical exercises using Stata where the emphasis will be on applying the methods from the course on real data. My slides and the tutorial files are available on Brightspace, and all lectures and tutorials will be in-person.

Assessment

<i>Component</i>	<i>Due Date</i>	<i>Weight (% of final grade)</i>
Assignment #1	September 24	10%
Midterm Exam	October 10	15%
Assignment #2	October 24	10%
Assignment #3	November 19	10%
Final Term Project	Proposal: October 31	20%
	Preliminary Draft: November 29	
	Final Paper: December 4	
Final Exam	Exam Period (December 6-17)	35%

The assignments will be available on Brightspace, and will include a combination of theoretical derivations and computer exercises; you can work on your own or in groups of 2 or 3. You may talk with members of other groups about the questions, but copying from another group, or submitting work that is not your own, is not permitted. Each assignment must be submitted before 5 pm on the due date; you can submit a paper copy in person or a PDF copy on Brightspace. Late assignments will be marked down by 20% per day.

The final term project is an individual project in which each student will use ordinary least squares to analyze cross-sectional economic data. Each student will be responsible for choosing a research question, formulating a regression model, finding relevant data and papers, performing the regression analysis, and discussing the results. A project proposal must be submitted by October 31, the first draft is due on November 29 for a format check (not graded), and the final version is due on December 4 (all deadlines are at 5 pm on the respective days). Detailed instructions will be provided in a document that will be posted on Brightspace. Late projects will be marked down by 20% per day. Plagiarism detection software may be used in my evaluation of your term projects.

In exceptional circumstances, if a student cannot submit an assignment or term project by the due date, the student must contact me before the deadline to discuss alternative arrangements.

Exams are “closed-book” and will take place in person. If a student is unable to write the exam for a valid reason, they must contact the instructor by email prior to the date and time of the exam, and submit a completed Student Declaration of Absence via Brightspace or by email (no medical note is required). If a student misses the midterm exam, its weight will be added to the final exam. If a student misses the final exam, they will have the opportunity to write a make-up exam.

All students are encouraged to read the information about Dalhousie’s policy regarding academic integrity at <https://www.dal.ca/about/leadership-governance/academic->

[integrity.html](#). If you haven't already done so, you are very strongly encouraged to complete the Writing Centre's Academic Integrity Module; see https://www.dal.ca/campus_life/academic-support/writing-and-study-skills/academic-integrity-module/academicintegritymoduleo.html for more information.

I will provide you with your grades throughout the semester using the Brightspace Gradebook tool.

Conversion of Numerical Grades to Final Letter Grades (Dalhousie Grading Scale)

Letter Grade	Range	Letter Grade	Range
A+	90-100	C+	65-69
A	85-89	C	60-64
A-	80-84	C-	55-59
B+	77-79	D	50-54
B	73-76	F	0-49
B-	70-72		

Textbook

The required textbook for this course is:

- James Stock & Mark Watson (2019), *Introduction to Econometrics*, 4th edition, Pearson Education.

The book is available at the Dal Bookstore, in both a hardback version and a digital version (a 180-day e-book); see the Bookstore website at [https://bookstore.dal.ca/CourseSearch/?course\[\]=SUB,FALL24,ECON,ECON3338,01](https://bookstore.dal.ca/CourseSearch/?course[]=SUB,FALL24,ECON,ECON3338,01) for more information. There is also a page of student resources available at https://www.princeton.edu/~mwatson/Stock-Watson_4E/Stock-Watson-Resources-4e.html.

Older versions of Stock & Watson, such as the 3rd edition from 2011, are also fine; they do not contain the new chapter 14 on big data and machine learning, but those subjects are not relevant for our class. However, some of the exercises have changed between the 3rd and 4th editions; I have scanned the exercises from the 4th edition, and they will be available on Brightspace.

The Stock & Watson textbook is one of the most popular for undergraduate econometrics, but it is not the only one. In particular, Jeffrey Wooldridge's "Introductory Economics: A Modern Approach" is also very popular, and has been used in the past for this class; and there are several other good undergraduate textbooks (Greene, Gujarati, Verbeek, Dougherty, Hall & Griffiths & Lim, etc). If you already have one of these textbooks, you can use it; however, you should be aware of some differences with respect to Stock & Watson. Most textbooks (including Wooldridge) start from the assumptions of normal and homoskedastic errors and non-

stochastic regressors, and later analyze how the results change if these assumptions are invalid. Stock & Watson start from the perspective that these assumptions are (almost) never valid in real life, and so it is better to start with the case where errors are not necessarily normal and homoskedastic and the regressors are stochastic. I will explain these differences further in the first class.

Software

There is no restriction on which software you use for your assignments, as long as you can submit a log file or script showing the analysis that you performed. However, like many professors in economics, I prefer Stata, and part of the tutorial time will be devoted to an introduction to this software. A one-year Stata/SE Student license is available for free to all Dalhousie Students, and you can download Stata/SE 18 at <https://software.library.dal.ca/>.

Course Schedule (Approximate)

Weeks	Subject & Chapters
1: Sept. 3 & 5	Introduction, Probability, and Statistics
2: Sept. 10 & 12	<ul style="list-style-type: none"> • Introduction to Econometrics (Chapter 1)
3: Sept. 17 & 19	<ul style="list-style-type: none"> • Review of Probability (Chapter 2) • Review of Statistics (Chapter 3)
4: Sept. 24 & 26	Simple Linear Regression
5: Oct. 1 & 3	<ul style="list-style-type: none"> • Linear Regression with One Regressor (Chapter 4 & 18)
6: Oct. 8	<ul style="list-style-type: none"> • Hypothesis Tests and Confidence Intervals (Chapter 5)
October 10	Midterm Exam
7: Oct. 15 & 17	Multiple Linear Regression
8: Oct. 22 & 24	<ul style="list-style-type: none"> • Linear Regression with Multiple Regressors (Chapter 6)
9: Oct. 29 & 31	<ul style="list-style-type: none"> • Hypothesis Tests and Confidence Intervals (Chapter 7)
10: Nov. 5 & 7	Non-Linear Regression Functions and Misspecification Testing
11: Fall Study Break	<ul style="list-style-type: none"> • Non-Linear Regression Functions (Chapter 8)
12: Nov. 19 & 21	<ul style="list-style-type: none"> • Misspecification Testing (Chapter 9)
13: Nov. 26 & 28	<ul style="list-style-type: none"> • Binary Dependent Variables (Chapter 11)
Exam Period (Dec. 6-17)	Final Exam

Tutorial Schedule

Cours	Sujets
2 : Sept. 12	Probability & Introduction to Stata
3 : Sept. 19	Statistics & Consistency
4 : Sept. 26	Simple OLS #1
5 : Oct. 3	Simple OLS #2
7 : Oct. 17	Tests & Confidence Intervals
8 : Oct. 24	Multiple OLS #1
9 : Oct. 31	Multiple OLS #2
10 : Nov. 7	Tests & Confidence Intervals for Multiple OLS
12 : Nov. 21	Non-Linear Regression Functions
13 : Nov. 28	Misspecification Testing

University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.html

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: <https://www.dal.ca/about-dal/internationalization.html>

Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (<https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html>)

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: <http://www.dal.ca/cultureofrespect.html>

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner – perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at:

https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at: <https://www.dal.ca/about/leadership-governance/academic-integrity/faculty-resources/ouriginal-plagiarism-detection.html>

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall

under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.

Student Resources and Support

University Policies and Programs

Important Dates in the Academic Year (including add/drop dates):

http://www.dal.ca/academics/important_dates.html

Classroom Recording Protocol:

https://www.dal.ca/dept/university_secretariat/policies/academic/classroom-recording-protocol.html

Dalhousie Grading Practices Policies:

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Grade Appeal Process: https://www.dal.ca/campus_life/academic-support/grades-and-student-records/appealing-a-grade.html

Sexualized Violence Policy: https://www.dal.ca/dept/university_secretariat/policies/health-and-safety/sexualized-violence-policy.html

Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>

Learning and Support Resources

General Academic Support – Advising (Halifax): https://www.dal.ca/campus_life/academic-support/advising.html

General Academic Support – Advising (Truro): <https://www.dal.ca/about-dal/agricultural-campus/ssc/academic-support/advising.html>

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness.html

On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond): https://www.dal.ca/campus_life/academic-support/On-track.html

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Indigenous Connection: <https://www.dal.ca/about-dal/indigenous-connection.html>

Elders-in-Residence (The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit the office in the Indigenous Student Centre or contact the program at elders@dal.ca or 902-494-6803:

<https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/UG/indigenous-studies/Elder-Protocol-July2018.pdf>

Black Student Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre.html

LGBTQ2SIA+ Collaborative: <https://www.dal.ca/dept/vpei/edia/education/community-specific-spaces/LGBTQ2SIA-collaborative.html>

Dalhousie Libraries: <http://libraries.dal.ca/>

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Dalhousie Student Advocacy Services: <https://www.dsu.ca/dsas?rq=student%20advocacy>

Dalhousie Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Human Rights and Equity Services: <https://www.dal.ca/dept/hres.html>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Study Skills/Tutoring: http://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Faculty of Science Advising Support:

<https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html>

Safety

Biosafety: <http://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

Radiation Safety: <http://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

Laser Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety/laser-safety.html>