

## **FRE 528 Applied Econometrics (Fall, 2022)**

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**Instructor:** Michael Johnson, PhD

**Contact Info:** Email: [mjohnson@mail.ubc.ca](mailto:mjohnson@mail.ubc.ca)

**Lectures:** Tues and Thurs 12:00 to 1:30pm in MCML 154

**Office Hours:** Thursdays 4-5pm **Office:** MCML 352

**Computer Lab:** Thursdays 4-5pm. Generally speaking (except for the first 3 weeks of classes – please see detailed schedule on last page), the Computer Lab is optional and will take place at the discretion of the instructor to support student learning. Computer Labs held in MCML 154.

**Course Support:** Juan Fercovic, Academic Coordinator, MFRE Program

**Email:** [juan.fercovic@ubc.ca](mailto:juan.fercovic@ubc.ca)

### **Course Overview**

This course will provide the necessary foundations and experience for students to conduct sound empirical research in Food and Resource Economics. The course will review the foundations of data and regression analysis and the common problems encountered by applied researchers (data constraints and econometric challenges) along with potential solutions to these problems. Students will be expected to manipulate data and apply the models presented in class on a weekly basis with assignments and lab sessions. Additionally, students will carry out a team-based project to further contribute to the understanding and application of applied econometrics.

### **Learning Outcomes:**

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At the end of this course, students will be able to:

- Develop a broad understanding of regression analysis using cross-sectional data relevant for analysing economic and business data. Fully understand the underlying assumptions of OLS and mitigation strategies when assumptions are violated.
- Understand the application and use of Logistic Regression and Panel Data Analysis (specifically First Difference and Fixed Effects estimation).
- Understand the context of applied econometrics to prediction and theory driven models.
- Specify, interpret and critically evaluate regression estimates using procedures of diagnostic testing and model validation.
- Understand important theoretical properties of ordinary least squares estimators and the statistical testing of hypotheses with regards to econometric modeling.
- Perform statistical tests to investigate whether the classical assumptions in regression analysis are satisfied, and what to do when such assumptions are violated.
- Understand the context of estimation using method of moments and the maximum likelihood principle for parameter estimation.
- Demonstrate proficiency in the use and application of Stata and R for conducting econometric analysis; Excel for data manipulation and conducting classical statistical tests; Tableau Prep for data cleansing/manipulation and cleansing; and Tableau Desktop for visual analytics.
- Interpret and understand academic literature concerning empirical analysis and econometrics. Develop critical thinking skills as a reader of journal articles that make use of the concepts and methods that are introduced in the course.
- Demonstrate proficiency in the development of econometric models to your own academic work and summer internship project.

## Course Structure

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The course will be delivered in-person during scheduled class times. Some content may be provided in recorded format to support student learning. Students are expected to attend and participate as required in all class activities. Absenteeism will affect your grades for participation and in-class TBL activities.

### Learning Management System and Communication

- Canvas (<http://canvas.ubc.ca>) will be used for course content delivery
- Canvas Notifications and Student email addresses will be used for communicating information and disseminating class materials. **It is your responsibility to check your email and the Canvas course website frequently.**

## Software, Textbook, Materials etc.

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**Required Software:** Excel, Tableau Desktop, Stata and R will be used in this course.

- **Stata** will be extensively used for econometric modeling. Lecture examples, problem sets and assignments will be presented using either Excel or Stata (or both), depending on the application. It is recommended to purchase your own license for \$48 USD online at: <https://www.stata.com/order/new/edu/gradplans/student-pricing/>
- **R statistical software** will be required to be used in this course for a minimum of one assignment. **Please be sure to download and install the most recent versions of R and R Studio for the course. Download R: Visit: <https://www.r-project.org/>** Once you have downloaded R, you can download RStudio. **Download RStudio: Visit: <https://rstudio.com/products/rstudio/download/>**
- **Microsoft 365** (Excel, Powerpoint, Word, etc) is available for free for UBC students. Mac users – please be sure to update to the Microsoft 365 because the Addins for Excel will be similar to Addins on PCs. Please sign up for your free MS software at: <https://it.ubc.ca/services/desktop-print-services/software-licensing/microsoft-365-students>
- Please sign up free your free student copy of **Tableau Desktop** using the following link: <https://www.tableau.com/academic/students>. Be sure to sign up for the software using your UBC email account. We will also be using **Tableau Prep** for data cleansing, manipulation and preparation.

### Recommended Textbook/References:

- R. Carter Hill, William E. Griffiths and Guay C. Lim, *Principles of Econometrics*, 2011 (4<sup>th</sup> edition), 2017 (5<sup>th</sup> edition). Available in KOERNER LIBRARY reserve collection: <http://resolve.library.ubc.ca/cgi-bin/catsearch?bid=4897188>
- A Stata guide for the textbook is also on reserve at the same location: *Using Stata for Principles of Econometrics*, 4<sup>th</sup> edition by Lee C. Adkins and R. Carter Hill.
- *Introductory Econometrics: A Modern Approach*, 2012, 5<sup>th</sup> Edition. Jeffrey M. Wooldridge. (Chapters 13 and 14 on Panel Data Analysis)

**Required Calculator:**

- Any 2-variable scientific calculator (Sharp EL 531 or 531XTWB or equivalent) is required. The following is available through the UBC bookstore:  
<https://the.bookstore.ubc.ca/Item?item=3425821> Lectures on regression analysis will be taught using the Sharp EL 531. **Programmable calculators are not allowed during exams.**

## Learning and Assessments

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**Evaluation**

Assessment Type	Weighting %
Assignments	20%
Team Project*	20%
Participation and Team-Based Learning (TBL) Activities	5%
Midterm Exam	25%
Final Exam	30%
<b>Total</b>	<b>100%</b>

**\*Includes a peer review from your team.** Grades will be modified in accordance with your individual contribution to your team's project.

## Course Policy: Assignments and Exams

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**Makeup Exams and Late Assignments:** There will be NO makeup exams or quizzes. If you miss an exam, you will receive zero marks. Likewise, late assignments will be heavily penalized and will be discounted by 50% per day. Exceptions may be made for documented medical reasons or extenuating circumstances. In such a case, it is the responsibility of the student to inform the instructor immediately (not after the exam or deadline has taken place). Notification after the examination date is not acceptable.

**Attendance: Required** Attendance is mandatory at ALL class. The course will be conducted using a **Team-Based Learning (TBL)** format, to develop both your leadership and team-building skills, while enhancing your learning beyond individual study. Your team will require access to a laptop computer during classes during TBL exercises.

## **ACADEMIC MISCONDUCT**

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Academic honesty is essential to the continued functioning of The University of British Columbia as an institution of higher learning and research. All UBC students are expected to behave as honest and responsible members of an academic community. Breach of those expectations or failure to follow the appropriate policies, principles, rules, and guidelines of the University with respect to academic honesty may result in disciplinary action.

**Academic misconduct** that is subject to disciplinary measures includes, but is not limited, to the following:

- **Plagiarism**, which is intellectual theft, occurs where an individual submits or presents the oral or written work of another person as his or her own. In many UBC courses, you will be required to submit material in electronic form. The electronic material will be submitted to a service which UBC subscribes, called TurnItIn. This service checks textual material for originality. It is increasingly used in North American universities. For more information, review TurnItIn website online.
- **Cheating**, which may include, but is not limited to falsification of any material subject to academic evaluation, unauthorized collaborative work; or use of unauthorized means to complete an examination.
- **Submitting others work as your own**, may include but not limited to i. using, or attempting to use, another student's answers; ii. providing answers to other students; iii. failing to take reasonable measures to protect answers from use by other students; or iv. in the case of students who study together, submitting identical or virtually identical assignments for evaluation unless permitted by the course instructor.
- **Resubmission of Material**, submitting the same, or substantially the same, essay, presentation, or assignment more than once (whether the earlier submission was at this or another institution) unless prior approval has been obtained from the instructor(s) to whom the assignment is to be submitted.
- **Use of academic ghostwriting services**, including hiring of writing or research services and submitting papers or assignments as his or her own.

**Student Responsibility:** Students are responsible for informing themselves of the guidelines of acceptable and non-acceptable conduct for examinations and graded assignments as presented via FRE code of conduct guidelines; course syllabus and instructors; and UBC academic misconduct policies, Review the following web sites for details:

- UBC Academic Misconduct and Discipline  
(<http://www.calendar.ubc.ca/Vancouver/index.cfm?tree=3,54,111,0>)
- UBC Learning Commons web-based Academic Integrity  
(<http://learningcommons.ubc.ca/academic-integrity/>).

**Penalties for Academic Dishonesty:** The integrity of academic work depends on the honesty of all those who work in this environment and the observance of accepted conventions. Academic misconduct is treated as a serious offence at UBC and within the MFRE program. Penalties for academic dishonesty are applied at the discretion of the course instructor. Incidences of academic misconduct may result in a reduction of grade or a mark of zero on the assignment or examination with more serious consequences being applied if the matter is referred to the Dean's office and/or President's Advisory Committee on Student Discipline.

## Copyright

All learning materials of this course (videos, course handouts, lecture slides, assessments, etc.) are the intellectual property of the instructor or licensed to be used in this course by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline and could be subject to legal action. Audio or video recording of classes are not permitted without the prior approval of the Instructor. Any lecture video and recordings are for the sole use of the instructor and for students currently enrolled in this class. In no case may the lecture video or recording (or other learning materials), or part of the recording be used by students or any other person for any other purpose, either personal or commercial. Further, audio or video recording of classes are not permitted without the prior consent of the instructor.

## Schedule\* (\*Tentative at best!)

Week	Overview of lecture topics	Readings
1 - Sept 5	Introduction to course and econometrics. Introduction to data visualization using Tableau Desktop. <b>Computer Lab 1:</b> Review of descriptive statistics; Excel Data Analysis Toolpak; Data types; classification of variables.	
2 - Sept 12	Tableau Desktop. Class survey. Inferential Statistics; Estimation <b>Computer Lab 2:</b> Pivot Tables. <b>Assignment #1 posted.</b>	Handouts
3 - Sept 19	Regression Basics: the simple linear regression model – Lectures 1 and 2. <b>Computer Lab 3:</b> Comparison of population parameters using hypothesis testing.	Handouts, Hill Chapt 1-5
4 - Sept 26	Regression Basics: interval estimation and hypothesis testing; prediction; goodness of fit; interpretation and modeling issues. Regression Case Study. <b>Assignment #2 posted.</b>	
5 - Oct 3	Transformations; Functional Forms. Discussion of Assignment 2.	
6 - Oct 10	Complete simple linear regression. Introduction to Multiple Regression.	
7 - Oct 17	Multiple Regression – assumptions, development processes. <b>Midterm Exam: Thurs. Oct 20<sup>th</sup> (12pm – 2pm)*</b>	Hill Chapt 6-8
8 - Oct 24	Multiple Regression continued. Indicator Variables. Tests for validity. <b>Assignment #3 posted.</b>	
9 - Oct 31	Heteroskedasticity. Tests for misspecification and structural stability.	
10 - Nov 7	Autocorrelation. <b>Assignment #4 posted.</b> <b>Nov. 10<sup>th</sup> – Class cancelled (Midterm Break Nov. 9-11).</b>	
11 - Nov 14	An introduction to Panel Data Analysis. First Difference and Fixed Effects.	Wooldridge Chapt HO
12 - Nov 21	Qualitative Dependent Variables (Logit, Probit, etc)	Hill Chapt 16
13 - Nov 28	Qualitative Dependent Variables. <b>Dec. 1st – Final class. Team Projects Sharing and Learning Session.</b>	

**\*Please note the midterm exam will extend beyond regular class time to allow extra time.**