



## ECON 345 Applied Econometrics

**Spring Session:** First Term, Sep-Dec 2024

**Instructor Name:** Dr. Felix Pretis

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**Office Hours:** Wednesdays 11:30 - 12:30 drop in and via email appointment.

**Lectures:** see online registration.

**Labs:** see online registration

**Teaching Assistant(s):** TBC

**Syllabus updated on:** Aug 28, 2024

### UVic Land Acknowledgement

*We acknowledge and respect the lək̓ʷəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.*

### Course Content

This course provides a general introduction to the practice of econometric analysis. We will focus largely on multiple regression techniques in cross-sectional data analysis (as well as time series analysis), considering common issues and problems that arise in applied empirical research. While motivated by intuition and applications, the presentation of estimators and tests will be primarily mathematical in nature. Students will learn *R* — a freely available and widely used statistical programming language — to analyse and plot data, draw inference, and compare alternative modelling approaches. The course closely follows the textbook “*Introductory Econometrics: A Modern Approach*” by J. Wooldridge.

### Learning Outcomes:

In this course you will gain an understanding of econometric methods and their applications. You will learn how to analyse data, interpret existing analyses, the basics of econometric theory that underpins econometric analysis, as well as independent research skills starting from formulating a research question to concise presentation of results. The course leads to highly transferrable modelling and programming skills through lab-based instruction using the statistical programming language *R* (widely used in academic research, government roles, and the private sector).

### Delivery:

This course will be offered in person following UVic’s guidelines. Students may be required to wear masks during lectures, labs, office hours, and exams (subject to public health guidelines). Online (Zoom) office hours may be offered by appointment.

## Textbooks

**Textbook (required):** The required textbook for this course is “*Introductory Econometrics: A Modern Approach*,” (Seventh Edition) by J. Wooldridge. It will be sold at the bookstore as a loose-leaf text (which saves you money), but you are welcome to buy it in bound form or find a used copy.

**Lab Textbook (optional):** Labs will be based on the statistical programming language R. The optional textbook “Using R for Introductory Econometrics” (Heiss, 2016) provides code to complete the exercises in Wooldridge and is freely available online at: <http://www.urfie.net/>

## Assessment

The course is assessed through a midterm exam (during term), a final exam (during UVic’s final exam period), an independent research project (+ proposal), a team forecasting competition, lab exercises, and problem sets. Lab exercises and problem sets will be assessed based on completion only (not on correctness). For all submitted assessments, I reserve the right to examine students in person concerning their understanding of their submitted work and adjust their mark accordingly.

### Overall Grade Structure:

Final Exam	50%
Midterm Exam	20%
Independent Research Project + Proposal	10%
Forecasting Competition Report	10%
Problem Sets (completion only)	5%
Lab Participation (completion only)	5%

*Exams (50% Final, 20% Midterm):* The final exam will take place during the December final examination period. There will be one midterm exam during class hours.

Items permitted during exams are: a non-programmable calculator without storage capacity (no Ti 89 etc.), pen and pencil, a water bottle, and your ID card. Any additional material will not be allowed on your desk during examinations. If you miss an exam without documented illness or family affliction, you will receive 0% on the exam. Any informal appeal or request for a grade review must be raised when exams are returned. Late requests will not be considered. A review request will involve a review of the entire exam and may result in a lower or higher grade.

**Important:** To ensure comprehensive understanding of the material, in order to pass the course your weighted-average exam grade (weighted average of 2/3 final exam grade and 1/3 midterm exam grade) must be at least 50%.

**Note:** All Material covered in lectures, labs, problem sets, and relevant textbook chapters, may appear on the exam, thus attendance in lectures and labs is highly encouraged. Attendance highly correlates with final course grades. All exams are cumulative since the material presented in lectures and chapters builds on itself.

*Independent Research Project (10%):* The independent research project is designed to give you real-world experience of conducting econometric research. For this project you may work in pairs (within each section, not across sections). You may choose any topic and dataset to estimate regression models to answer a research question that interests you. Earlier in the term, you will first submit a half page research proposal (marked only on completeness, not correctness). Then, for the final research project, present your results in

the form of a written academic essay (no bullet points, screenshots, or copy-pasted tables/code) presenting your hypothesis, data, methods, and results, with a maximum length of 3 pages + references. You must also submit your data and R-code that completely replicates your results reported in your final project. If the R-code or data is not submitted or does not replicate the project, 20% will be deducted from the final project mark.

The research project constitutes independent work - you must reference any literature you cite and any data and methods you use. The use of AI (e.g. large language models) is permitted with restrictions for this assignment. If you decide to use AI for the research project, you must include a statement on which AI was used, what prompts you used, and a short (1 page) report fact-checking the AI output, otherwise the use of AI will count as a violation of academic integrity. You are also responsible for any code produced by AI, and that any code runs and replicates all your results when submitting your work. The consequences of plagiarism range from a failing grade for an assignment or course to disciplinary probation or even expulsion from the university. Review "[What is Plagiarism](#)" for the definition of plagiarism.

Both the proposal and the final project must be submitted. No extensions will be granted on the project without formal documented illness or affliction (see policy on late assignments). If the project is submitted late, 10% will be deducted per day past the due date. If the proposal is submitted late (or not submitted at all), 5% from the final project mark will be deducted per day, up to a maximum of 20% of the project mark. If you do not submit the final research project without documented illness or family affliction, you will receive an "N" for the course.

*Group Forecasting Competition (10%):* The forecasting competition is designed to give you real-world experience of forecasting. As part of the course, we will hold a real-world forecasting competition – using a model you estimate you will be predicting time series observations. While there will be a prize for the most accurate forecasts, the forecast accuracy will not affect your grade. As part of a group (of any size), you will submit your forecasts online, together with a short academic essay (maximum 2 pages + references) describing your forecasting model and resulting forecasts. The use of AI (e.g. large language models) is permitted with restrictions for this assignment. If you decide to use AI for the forecasting competition, you must include a statement on which AI was used, what prompts you used, and a short (1 page) report fact-checking the AI output, otherwise the use of AI will count as a violation of academic integrity. If the forecast report is submitted late, 10% will be deducted per day past the due date. If you do not submit the forecast competition report without documented illness or family affliction, you will receive an "N" for the course.

*Short Problem Sets (5%):* There are weekly short problem sets designed to give you practise of solving econometric problems to be completed during the course. They are graded only on completion, not on correctness (i.e. if you submit half of all problem sets you will receive 2.5% out of the possible 5%). You may work in groups; but each student needs to submit their own copy of the assignment to Brightspace. Answers have to be submitted by 7pm by uploading PDF versions of the answers to Brightspace (if you scan/photograph handwritten answers make sure they are legible and converted to PDF format). No extensions will be granted on the problem sets without formal documented illness or family affliction. You can miss one problem set without penalty.

*Lab Participation (5%):* Lab exercises are designed to teach you econometric modelling in practise using the statistical programming language R. Answers to the short weekly lab problems should be submitted via Brightspace (or handed in in-person during labs) by Fridays, 7pm of the relevant weeks. These will be marked on completion only, and not on correctness. No extensions will be granted on lab exercises without formal documented illness or family affliction. You can miss one lab without penalty.

**Essential Course Requirements:** The independent research project, forecast competition report, and final exam must be completed to not receive an “N” on this course. Your weighted-average exam grade (2/3 weight on final, 1/3 weight on midterm exam) must be at least 50% to pass the course. If your overall course average is above 50% but the weighted exam grade is below 50%, then your final grade will be 49%.

**Grading Scale:**

Passing Grades	Percentage	Description
A+	90-100	Exceptional, outstanding performance. Normally achieved by a minority of students. These grades indicate a student who is self-initiating, exceeds expectations and has an insightful grasp of the subject matter.
A	85-89	
A-	80-84	
B+	77-79	Very good, good and solid performance. Normally achieved by the largest number of students. These grades indicate a good grasp of the subject matter or excellent grasp in one or more areas balanced with satisfactory grasp in other areas.
B	73-76	
B-	70-72	
C+	65-69	Satisfactory, or minimally satisfactory. These grades indicate a satisfactory performance and knowledge of the subject matter.
C	60-64	
D	50-59	
<b>Failing Grades</b>		
F	0-49	Unsatisfactory performance. Wrote examinations and completed course requirements.
N	0-49	Did not complete course requirements by the end of term or session.

**Course Policies**

This course adheres to the [Department Course Policies](#) of the Department of Economics on:

- Academic concessions
- Academic integrity (plagiarism and cheating)
- Attendance
- Grading
- Inclusivity and diversity
- Late adds
- Late assignments
- Repeating courses
- Review of an assigned grade
- Students with a disability
- Term assignments and debarment from examinations
- Travel plans
- Waitlists

The following policies are explicitly included because of their importance.

**Late Assignments and Missed Examinations**

Consideration for missed examinations or late assignments will be given only on the basis of documented illness (or in-line with the University’s policies at the time), accident or family affliction, and for no other reasons. In the event of a missed examination, students are advised to follow the procedures outlined in the University Calendar: [University Examination Policies](#)

If a student misses an exam due to one of the above reasons, there may be a makeup exam offered during the Economics department's makeup exam sessions. More than one makeup exam is not regularly given, and students should follow University's guidelines on formal deferrals. Students are advised not to make work or travel plans during lecture and lab hours to be able to attend all classes and examinations. There will be no special accommodation (and no makeup exams) if travel plans conflict with examinations held during class hours or the examination period. There will be no extensions for problem sets, lab exercises, the research project, or forecasting competition. A lab exercise, or problem set that is submitted late will count as not submitted.

### **Waitlist Policies**

- Instructors have no discretion to admit waitlisted students or raise the cap on the course.
- Students on the waitlist should discuss with the instructor how to ensure they are not behind with coursework in the event they are admitted.
- Registered students who do not show up in the first seven calendar days from the start of the course may be dropped from the course.
- Registered students who decide not to take the course are responsible for dropping the course, and are urged to do so promptly out of courtesy toward waitlisted students.
- Waitlist offers cease after the last date for adding courses irrespective of published waitlists.

### **Academic Integrity**

Academic integrity requires commitment to the values of honesty, trust, fairness, respect, and responsibility. Students are expected to observe the same standards of scholarly integrity as their academic and professional counterparts. Review "[What is Plagiarism](#)" for the definition of plagiarism. Note: Submitted work may be checked using plagiarism detection software as well as selected for plagiarism audits. This applies to all exams and submitted work, including problem sets, the research project, and forecasting competition entry.

Students must abide by UVic academic regulations and observe standards of 'scholarly integrity,' (no plagiarism or cheating). This applies to all assignments and exams (take-home or otherwise). Any online exams must be taken individually and not with a friend, classmate, or group. All alleged violations of academic integrity will be investigated and a student who is found to have engaged in unethical academic behaviour, including the practices described in the [Policy on Academic Integrity](#) in the University Calendar, is subject to penalty by the University.

### **Artificial Intelligence (AI)**

The use of AI (e.g. large language models) is permitted with restrictions in this course. AI must not be used for exams. If you decide to use AI for the research project or forecast competition, you must include a statement on which AI was used, what prompts you used, and a short (1 page) report fact-checking the AI output. You are also responsible for any code produced by AI, and that any code runs and replicates all your results when submitting your work. Use of AI for problem sets and labs is discouraged since these are graded on completion only (no points deducted for mistakes) and the material serves as preparation for the exams. Should you violate this rule, you will have violated UVic's academic integrity policy and a complaint against you under this policy will be filed accordingly.

### **Student Code of Conduct**

The Humanities, Science, and Social Sciences Faculties have adopted this [Student code of conduct](#).

## University Policy on Human Rights, Equity and Fairness

The University is committed to promoting, providing and protecting a positive, supportive and safe learning and working environment for all its members. See [General University Policies](#)

## Accessibility & Health Resources

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, you are free to approach me; however, you must register with the [Centre for Accessible Learning](#) (CAL) for formal arrangements to be made. The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

[Health Services](#) - University Health Services (UHS) provides a full service primary health clinic for students, and coordinates healthy student and campus initiatives.

[Counselling Services](#) - Counselling Services can help you make the most of your university experience. They offer free professional, confidential, inclusive support to currently registered UVic students.

[Elders' Voices](#) - The Office of Indigenous Academic and Community Engagement (IACE) has the privilege of assembling a group of Elders from local communities to guide students, staff, faculty and administration in Indigenous ways of knowing and being.

## Brightspace

Brightspace is used extensively for the course. All students are expected to be fully functional with the system. The lecture material, problem sets, and labs will be posted in Brightspace. Please note that the lecture notes online are only outlines of the actual lectures, and additional material may be covered during the lectures. All announcements will be posted in Brightspace. Students are advised to check it frequently.

## Course Experience Survey (CES)

I greatly value your feedback on this course to continually improve the course and my teaching.

Informal early feedback: Early on during the lectures, I may distribute informal feedback forms to provide ongoing feedback on the instruction style. These will be anonymous and only used to improve teaching while the course is progressing.

Formal Experience Survey: Towards the end of term you will have the opportunity to complete a confidential course experience survey (CES) regarding your learning experience. The survey is vital to providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future.

When it is time for you to complete the survey, you will receive an email inviting you to do so. If you do not receive an email invitation, you can go directly to the [CES log-in](#). You will use your UVic NetLink ID to access the survey, which can be completed on your laptop, tablet or mobile device. I will remind you nearer the time, but please be thinking about this important activity, especially the following three questions, during the course.

- What strengths did your **instructor** demonstrate that helped you learn in this course?
- Please provide specific ideas as to how the **instructor** could have helped you learn more effectively.
- Please provide specific suggestions as to how this **course** could be improved.

## Course Schedule

The course closely follows the Wooldridge textbook. The tentative course structure and schedule is shown below. This is subject to change – check Brightspace for up-to-date topics and deadlines.

Topic	Wooldridge Readings
Course Introduction & Statistics Review	Math Refresher/Appendix A-C
Introduction to Econometrics	Chapter 1
Univariate regression	Chapter 2
Multivariate regression	Chapter 3
Inference	Chapter 4
Asymptotics	Chapter 5
Further Issues: Functional Form & Model Specification	Chapter 6
Binary Variables	Chapter 7
Introduction to Time Series	Chapter 10 + Further Reading
Heteroskedasticity	Chapter 8
Causality & Instrumental Variables (time permitting)	Chapter 15 + Further Reading

- Midterm Exam (during class times): Monday, October 28<sup>th</sup>.
- Final Exam: during UVic’s final examination period. Date and time to be confirmed.
- Research Project:
  - Proposal: due October 17<sup>th</sup>, 7pm
  - Final Project: due November 4<sup>th</sup>, 7pm
- Forecasting Competition Entry & Report: due Friday, November 22<sup>nd</sup>, 7pm
- Problem Sets:  
Generally due Thursdays at 7pm uploaded to Brightspace, starting Thursday September 12<sup>th</sup>. Due-dates may be adjusted to reflect course content covered in lectures. Please check Brightspace for up-to-date due dates.
- Lab Exercises:  
Generally due Fridays at 7pm uploaded to Brightspace (or submitted during the lab), starting Friday September 13<sup>th</sup>. Due-dates may be adjusted to reflect course content covered in lectures. Please check Brightspace for up-to-date due dates.

All due dates and times refer to Pacific time.

## **Repeating Courses**

According to the University of Victoria Calendar <http://web.uvic.ca/calendar>

*“A student may not attempt a course a third time without the prior approval of the Dean of the Faculty and the Chair of the Department in which the course is offered unless the calendar course entry states that the course may be repeated for additional credit. A student who has not received this approval may be deregistered from the course at any point and may be asked to withdraw from his or her declared or intended program.”*

In order to request permission to attempt this course for the third time, you must follow the instructions provided under the link **Repeating Courses** at

<http://www.uvic.ca/socialsciences/economics/undergraduate/home/course%20policies/index.php>

Failure to obtain permission will result in deregistration from the course.

## **E-mail correspondence**

Emails should be limited to critical matters, such as inability to attend an exam, or prolonged illness, and should include the course name and number in the subject line. Questions on course material should be asked during office hours or in class. I will not respond to emails that can be answered using the course syllabus or textbook. Please make sure to use a professional tone in your emails.

## **Reference Letters**

Students in this course regularly request reference letters for graduate school or job applications. A generic letter written by someone that knows you superficially, might work against you. Therefore, if you are considering asking me to provide a reference letter, please make sure that: you speak to me with sufficient notice; and have actively participated in class/office hours for me to provide a positive assessment of your performance and engagement with the material.

## **Electronic devices**

You are encouraged to install econometric software on your personal computers. R (<https://cran.r-project.org/>) and RStudio (<https://www.rstudio.com/>) are freely available online, the lab will cover use of the software. You are also encouraged to bring your own laptops with R and RStudio installed to the labs.