



ECON 365 Econometrics: Part I (CRN: 11126)

First Term, Sep-Dec 2024

Instructor Name: Dr. Tao Wang

Office: BEC 392

Class Times: Mondays and Thursdays 8:30 AM-9:50 AM

Lab Times: Thursdays 3:30 PM-4:20 PM

E-Mail: taow@uvic.ca

Office Hours: Mondays 1:00 PM-3:00 PM and via email appointment

TA: TBA

Note: *Students are highly encouraged to take full advantage of office hours. This time provides a valuable opportunity not only to ask questions and clarify any doubts related to the lecture material but also to delve deeper into topics of interest, discuss assignments, and receive personalized feedback.*

UVic Land Acknowledgement

We acknowledge and respect the lək'wəŋən peoples on whose traditional territory the University of Victoria stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.

Course Content

This course is the first part of the ECON 365/366 sequence, focusing on Econometrics, which is the foundation of all empirical economic analysis. Econometrics enables us to connect theoretical insights about economic behavior—both at the macro and micro levels—with real-world data and measurement. The primary goal of both ECON 365 and ECON 366 is to equip you with a robust foundation for conducting basic empirical research while also preparing you for more advanced coursework, both at the undergraduate and graduate levels.

ECON 365 introduces the essential tools of estimation and inference within the framework of multiple regression analysis, with a particular emphasis on the rigorous application of matrix algebra to econometric models. The course aims to establish the theoretical basis for various econometric models, explore the mechanics of these models, identify different model variants, and understand how economic theories are linked with econometric techniques. This course has a strong technical and statistical focus, where key concepts will be demonstrated through proofs, alongside a significant programming component to apply these concepts practically.

The core material covers in ECON 365 are: *multiple regression, maximum likelihood estimation, restricted least squares, hypothesis testing, functional form, specification and model selection strategies, nonlinear least squares, and time series models.* The topics may also include *Bayesian econometrics.*

Note: *The ECON 365/366 sequence distinguishes itself from a general applied econometrics course by providing a more rigorous and in-depth exploration of econometric theory and methods. While a general applied course primarily focuses on the practical application of econometric techniques for data analysis and interpretation, ECON 365/366 integrates a strong emphasis on the mathematical foundations, including formal proofs, advanced topics like maximum likelihood estimation and time series econometrics, and substantial programming components. This sequence is designed to equip students with both the theoretical knowledge and practical skills necessary for advanced research or further academic study in econometrics, offering a more comprehensive and challenging experience compared to the more practice-oriented applied courses.*

Learning Outcomes

The purpose of this course is to give you a foundation in econometrics techniques. Upon successful completion of this course, you will be able to:

- (i) Critically evaluate the nature and scope of econometrics within the broader context of social sciences;
- (ii) Gain mastery over the foundational concepts and various econometric models;
- (iii) Recognize how different econometrics techniques are used to estimate relevant economic parameters and test the economic hypothesis;
- (iv) Independently conduct preliminary research papers, demonstrating your ability to apply econometric methods in real-world economic analysis.

Prerequisites

Success in this course requires a strong willingness to work hard on unfamiliar material. A solid understanding of basic econometric methods, linear algebra, multivariate calculus, and elementary probability theory is essential. The course also assumes that you have some foundational knowledge of R for data analysis and programming.

Textbook

There is no single textbook for this course, and lecture notes and readings will be available on the Brightspace website. The following three books, however, are highly recommended:

- Greene, W. *Econometric Analysis*. Pearson, 8th ed.
- Hansen, B. E. *Econometrics*. Princeton University Press.
- Hanck, C., Arnold, M., Gerber, A., and Schmelzer, M. *Introduction to Econometrics with R*.
<https://www.econometrics-with-r.org/>

Note: *The first two books are excellent, yet challenging, as they approach regression from a conditional expectation perspective and cover most of the topics in this course. Although no specific textbook readings will be assigned, you are expected to read the corresponding chapters for each topic discussed in class. Additionally, the material posted on Brightspace are intended exclusively for students enrolled in ECON 365 this semester. You do not have the instructor's permission to share ECON 365 course material on any external sites.*

Grading

The course will include both lectures and labs, with your grade determined by assignments, lab quizzes, a midterm exam, and a final exam (which is not cumulative). These components are designed to comprehensively assess how well you have met the course objectives. Specific details will be discussed in class.

- **Assignments (40%):** This is a methodological course, developing skills in understanding and applying econometric methods. You can only learn metrics by doing assignments. There will be four assignments for this course. Assignments will be posted to Brightspace and announced approximately one week before they are due. You should turn in a hard copy of your homework before class on the day they are due. You may work on the assignments with your classmates, which is encouraged. But you must write up your answers independently! Assignments submitted by students that are discovered to be identical or nearly identical will receive a zero grade. All of the assignments will help you prepare for the exams.
- **Lab Quizzes (10%):** We need to navigate through technical dexterity and empirical relevance. Labs, supervised by the TA in this course, will consist of applied econometric work using R and assignment problem review. It is expected that all of you will attend labs. You need to answer a short question in each lab and submit it to your TA. These quizzes are based on class lecture, aim to quickly review recently covered material, and give you feedback on how well you are learning the course. At the end of the semester, the lowest two quiz scores will be dropped.

- **Midterm Exam (20%):** The midterm exam will be held in class. Although the R programming language is used to apply econometric techniques to data, the exam will solely involve paper and pencil. The material covered by the midterm will be announced in advance and I also will provide a review session before the exam. All grades of exams are final except for correcting obvious grading mistakes. For example, points are added up incorrectly, or obviously correct answers are mistakenly marked wrong. Please bring these to my attention within one week following the return of the exam. There will be no makeup midterm exam. If you miss the midterm for a documented reason (i.e., illness or emergency) and obtain evidence from a doctor or other relevant staff, then your final exam will receive a total weight of 50%. If you miss the midterm without a valid documentation, you will automatically lose the 20% of the full mark.
- **Final Exam (30%):** The final exam will take place during the time slot allocated by the university. The final exam is not comprehensive and only covers the topics after the midterm. On the last day of this course, there will be a review session for the final. If you miss the final exam and has a valid documentation, you will be required to take a makeup exam administered by the department at the officially announced day and time. If you miss the final exam without a valid documentation, you will not have chance to retake the final and will receive zero for the final exam.

Note 1: *It is not appropriate to request grade adjustments or special extra credit chances after presenting unsatisfactory performance for an assignment or exam or failing to receive the grade you had hoped for. These requests will not be granted. However, I do reserve the right to raise every student's grade by the same amount or offer an opportunity for extra credit to all students if scores on an assignment or exam are low across most or all students (but such events are rare).*

Note 2: *For both midterm and final exams, you will be allowed to bring a "formula sheet"—either handwritten or typed on both sides of an 8 1/2× 11-inch sheet of paper. Exams do not require a calculator, computer, mobile phone, or any other electronic device. No electronic devices are allowed during exams.*

Grading Scale:

A+	A	A-	B+	B	B-	C+	C	D	F or N
90-100	85-89	80-84	77-79	73-76	70-72	65-69	60-64	50-59	0-49

Students should review the University's more detailed [summary of grading](#).

Missing Assessments

Should students encounter a situation where they miss an exam or cannot submit an assignment at its due date, they may qualify for an academic concession. Students are required to indicate the specific grounds on which they are requesting an academic concession and to provide a justification outlining the impact of the circumstances on their ability to complete course requirements. For in-course extensions, please [fill in the form and follow the instructions on the form](#). I will not respond to informal requests of academic concessions. In case you miss the final exam, fill in a [request for a deferral](#).

Students are advised not to make work or travel plans until after the examination timetable has been finalized. Students who wish to finalize their travel plans at an earlier date should book flights that depart after the end of the examination period. Students do not qualify for an academic concession if travel plans conflict with the examination.

Course Policies

This course adheres to the [Undergraduate Course Policies](#) of the Department of Economics that deal with the corresponding issues. The following policies/suggestions are explicitly included because of their importance.

You will not be graded on attendance. However, attendance is required to receive credit for quizzes and exams. You are also expected to treat everyone in the classroom with respect. Getting to class late, sleeping, talking out of turn, using your cell phone or other devices, or otherwise being distracted and distracting, are not acceptable

classroom activities. Please let me know immediately if you have a health problem or disability that necessitates leaving the room during class time, or if you have a conflict that regularly prevents you from getting to class on time.

Consideration for missed assignments, quizzes, and exams will be given only on the basis of documented illness (in-line with the University's policies at the time), accident, or family affliction, and for no other reasons. You will receive a grade of zero on the missed assignments, quizzes, and exams if no valid excuse is presented. Students are advised not to make work or travel plans during lecture hours to be able to attend all classes and labs. There will be no special accommodation if travel plans conflict with quizzes or exams.

The rule of thumb in college is that you study for at least 2 hours outside of class for each hour you spend in class. This means you should spend a minimum of 6 hours per week studying for ECON 365. Please know that econometrics is a cumulative process, with each step building on the previous foundations. Please do not fall behind! I want you to perform well in this class! If you become concerned about your progress, please see me immediately. Please come to office hours if you have any questions about the material covered in this course.

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. 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.

Review [What is Plagiarism](#) for the definition of plagiarism. The University reserves the right to use a plagiarism software to detect violations of academic integrity (including unauthorized use of ChatGPT and other Artificial Intelligence). This applies to all exams and submitted work. 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

We are all responsible for creating a learning environment that is welcoming, inclusive, equitable, and respectful. 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](#).

Resources for Students

[UVic Learn Anywhere](#) - UVic Learn Anywhere is the primary learning resource for students that offers many learning workshops and resources to help students with academics and learning strategies.

[Centre for Accessible Learning](#) - 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.

[Centre for Academic Communication](#) - Offers coaching on [academic integrity](#), including preventing accidental plagiarism. Provides support to students with time management, reading, writing, speaking, understanding academic expectations, and other aspects of academic communication as well as creating academic posters, blogposts, PowerPoint slides, and e-portfolios.

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

[Support Connect](#) - a 24/7 mental health support service for students

- Toll-free (calls from North America): 1-844-773-1427
- International collect calls: 1-250-999-7621

[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.

[Indigenous Student Services](#) - Indigenous UVic students have access to many sources of support on campus. Before, during and after your time at UVic, you are encouraged to explore programs and services available to you, such as [Indigenous counselling services](#) and the [Elders in Residence](#), as well as non-academic programs that may be of interest to you.

[International Student Support](#) - The University of Victoria offers a number of resources to support international students as they pursue their studies. UVic's [International Centre for Students](#) is the primary office supporting international students on campus at the university-wide level and provides various supportive program through the [UVic Global Community Initiative](#), including a Mentorship Program and Conversation Partner Program.

For academic advising-related questions, students in the Economics Department are also encouraged to meet with the Economics Undergraduate Advisor (Brooklynn Comish-Trimble, ecadvice@uvic.ca) as well as an academic advisor in the [Academic Advising Centre](#) early in their studies to help map out a plan to declare a major and complete university program requirements. Other resources include the [Centre for Academic Communication](#) and the [Math and Stats Assistance Centre](#).

The International Student Liason in the Economics Department is Dr. Paul Schure who can help you connect with other international and domestic students in the Department. His email address is schure@uvic.ca. Please, reach out if you are interested.

Sexualized Violence Prevention & Response

UVic takes sexualized violence seriously, and has raised the bar for what is considered acceptable behaviour. Students are encouraged to learn more about how the university defines sexualized violence and its overall approach by visiting www.uvic.ca/svp. If you or someone you know has been impacted by sexualized violence and needs information, advice, and/or support please contact the sexualized violence resource office in Equity and Human Rights (EQHR). Contact svpcoordinator@uvic.ca.

Brightspace

Brightspace is used extensively for the course. All students are expected to be fully functional with the system. The lecture notes, 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 value your feedback on this course. 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 suggestions as to how the **instructor** could have helped you learn more effectively.
- Please provide specific suggestions as to how this **course** could be improved.

E-mail Correspondence

Emails should be limited to critical matters, such as inability to attend class, an exam, or prolonged illness, and should include the course name and number in the subject line. Questions whose answers involve explaining course material should be asked during office hours or in class. Should you send an email for whatever reason, please use your UVic email address and do put “ECON 365” in the subject line. I will strive to respond to your course emails within 24 hours.

Electronic Devices

The statistical program R will be used extensively in this course for all applied econometric analysis. R is freely available across platforms. I also recommend using RStudio as a tool for writing code in R, which is an interface for using R. You are encouraged to install [R](#) and [RStudio](#) on your personal computers based on your operating system (Windows, Mac, etc.). For this course, TA will teach you how to code in R from basics. Nevertheless, it is your responsibility to read up on R and fully learn how to perform the required analysis. R Bloggers is a website dedicated to R related material.

Course Schedule

Below is a list of topics that will be covered in this course. Please note that this is a preliminary schedule, intended to serve as an outline and guide. Depending on time constraints, some of the topics may not be covered in full or may be adjusted as necessary, with certain topics potentially being moved to ECON 366.

Topic	Important Dates
Topic 1: Review of Matrix Algebra	Sep 26th Assignment 1 Deadline (Class)
Topic 2: Review of Statistics	Oct 17th Assignment 2 Deadline (Class)
Topic 3: Multiple Regression	Oct 21st Review for Midterm Exam
Topic 4: Maximum Likelihood Estimation	Oct 24th Midterm Exam (During Class Time)
Topic 5: Restricted Least Squares	Nov 14th Assignment 3 Deadline (Lab Session)
Topic 6: Hypothesis Testing	Dec 2nd Assignment 4 Deadline (Class)
Topic 7: Functional Form	Dec 2nd Review for Final Exam
Topic 8: Specification and Model Selection Strategies	
Topic 9: Nonlinear Least Squares	
Topic 10: Time Series: AR(p) & MA(q)	
Topic 11: Time Series: ARIMA(p,d,q)	
Topic 12: Bayesian Econometrics-Part I	
Topic 13: Bayesian Econometrics-Part II	

Note 1: Assignment will be collected during the lecture/lab session on the due date. All assignments contribute to your final grade, and no assignment scores will be dropped.

Note 2: The class on Nov 14th will be held via zoom.