



## **ECON 366 Econometrics: Part II (CRN: 21091)**

**Spring Term, Jan-Apr 2023**

**Instructor Name:** Dr. Tao Wang

**Office:** BEC 392

**Class Times:** Cornett Building B107, Mondays and Thursdays 16:30-17:50 PM

**Lab Times:** BEC 170 or DSB C128, Wednesdays 15:30-16:20 PM (B01), 16:30-17:20 PM (B02)

**E-Mail:** taow@uvic.ca

**Office Hours:** Thursdays 12:30-14:30 PM and via email appointment

**TA:** Yin Shi (echoeden@uvic.ca) Office hours: Fridays 9:00-11:00 AM BEC 308

**Note:** *Students are encouraged to make full use of the office hours, where they can ask questions and go over lecture material.*

### **Course Content**

This is the second course in the ECON 365/366 sequence. We will use many of the methodologies discussed in ECON 365 to advance one's knowledge of fundamental concepts within econometrics. Econometrics is the basis of all empirical economic analysis, which allows us to bridge theory about economic behavior both at the macro and the micro levels and measurement. The aim of both ECON 365 and ECON 366 is to provide you with a solid background for undertaking basic empirical research, as well as preparing you for more advanced courses at the undergraduate and graduate levels. ECON 366 covers the basic tools of estimation and inference in the context of multiple regression. The objective is to formulate the theoretical underpinnings of various models, to study the workings of many econometric models, to be able to recognize variants of existing models, and to understand the connections of machine learning methodologies with econometrics tools. The course will feature a substantial technical/statistical component (all statements will be demonstrated by the proof), as well as a programming part. The core material covers *multiple regression, GLS estimation, ridge regression, instrumental variables estimation, measurement error models, seemingly unrelated regression equations models, simultaneous equations models, probit and logit models, panel data models, quantile regression, and machine learning methods.*

### **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) Understand the nature and scope of econometrics as a social science;
- (ii) Master the foundations of different econometrics models;
- (iii) Recognize how different econometrics techniques are used to estimate relevant economic parameters and test the economic hypothesis;
- (iv) Be able to conduct preliminary research papers on your own.

### **Prerequisites**

*Willingness to work hard on unfamiliar materials.* Understanding of basic econometric methods, linear algebra, multivariate calculus, and elementary probability theory. Students typically benefit more from the class if they have taken ECON 365 and got a minimum grade of B. The course assumes that you have some basic knowledge of R.

### **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 and challenging books that approach regression from a conditional expectation approach. They cover most of the topics in this course. I will not assign any textbook readings, however, you are expected to read the corresponding chapters for each topic covered. The materials posted on Brightspace are meant solely for students attending ECON 366 this semester. You do not have the instructor's permission to supply the ECON 366 course materials to any sites.*

## **Grading**

The course involves lectures and labs. The course grade will base on assignments, lab quizzes, midterm exam, and final exam (not cumulative), which are intended to be a comprehensive examination of how closely you have managed to fulfill the stated objectives of the course. 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. Since we have two rooms for lab classes, there will be an advance announcement on which room to go to for the lab for that week.
- **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).* (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](#).

### **Course Policies**

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 366. 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.

### **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](#)

### **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.

## **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](http://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](mailto: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 will be posted in *Brightspace*. Please note that the lecture notes online are only outlines of the actual 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. I will remind you nearer the time.

## **Course Schedule**

Below is a list of topics for this course. This is a preliminary schedule, which is meant to serve as an outline and guide. Depending on time constraints, we may choose to not cover some of the topics below.

| <b>Topic</b>   | <b>Important Dates</b>                    |
|--|---|
| Topic 1: Review of Statistics and Matrix Algebra         | Jan 27th Assignment 1 deadline            |
| Topic 2: Multiple Regression                             | Feb 17th Assignment 2 deadline            |
| Topic 3: GLS Estimation                                  | Feb 17th Review for Midterm Exam          |
| Topic 4: Ridge Regression                                | Feb 27th Midterm Exam (During class time) |
| Topic 5: Instrumental Variables Estimation               | March 16th Assignment 3 deadline          |
| Topic 6: Measurement Error Models                        | March 30th Assignment 4 deadline          |
| Topic 7: Seemingly Unrelated Regression Equations Models | April 6th Review for Final Exam           |
| Topic 8: Simultaneous Equations Models                   |   |
| Topic 9: Probit and Logit Models                         |   |
| Topic 10: Panel Data Models                              |   |
| Topic 11: Quantile Regression                            |   |
| Topic 12: Machine Learning Methods                       |   |

**Note:** Assignment will be collected at the lecture on the due date. All assignments contribute to your final grade. No assignment scores are dropped.

## **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 366" 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 materials.

## **UVic Land Acknowledgement**

*We acknowledge with respect the Lekwungen peoples on whose traditional territory the University of Victoria stands, and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.*