

## Economics 493(L01) (Empirical Energy Economics)

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Lecture Location: ZOOM Delivery  
Lecture Days/Time: TR 15:30 - 16:45

Office Hours: TR 14:00 – 15:00

(Winter 2021)

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### Course Description:

This is the capstone course for the Applied Energy Economics program. Students will investigate their own research topic by applying data analysis in combination with knowledge and skills acquired in the program. Students will learn econometric techniques that are particularly useful in the context of energy economics. The lectures will focus on the practical implementation of these techniques through examples and exercises directly linked to their research project. The course will also discuss and critically review some of the top research papers in energy economics and current energy topics.

**Prerequisites/corequisites:** Economics 357, 395 and 427

### Course Learning Outcomes:

Students who successfully complete this course will be knowledgeable and familiar with:

#### Data skills:

1. Data collecting from various energy data sources
2. Data cleaning, formatting, and imputing missing observations
3. Data visualization and descriptive statistics
4. Using statistical software to conduct empirical analysis

#### Econometric skills:

5. Statistical theory used to support and build econometric models
6. Formulating and evaluating econometric equations
7. Causal models and inference
8. Resolving identification issues in econometric modelling
9. Interpreting estimators such as least squares and maximum likelihood
10. Cross section vs panel data vs time series analysis
11. Various methods and models may include: CAPM, regression discontinuity, event study, quantile regression, instrumental variables, levelized cost of energy (LCOE), demand models, estimation of costs functions, price forecasting techniques, Cointegration

#### Research and communication skills:

12. Devising a precise research question and writing a research proposal
13. Critically assess empirical methods and findings of published academic papers
14. Research presentation of empirical results tailored to different audiences
15. Constructive feedback to colleagues and peers

**Course Outline:**

In the 21st century, “data and statistical literacy” are essential skills to thrive in the knowledge economy and to flourish as an informed citizen in an increasingly complex society. This course is about nurturing these data skills, acquiring a set of practical tools for statistical analysis, and fostering scientific critical thinking through the elaboration of an empirical research on an energy topic of the student’s choice. The research paper is a major undertaking that brings together students’ understanding of energy markets, statistical and econometric techniques, and presentation of research findings.

The lectures, exercises and deliverables of the term paper will guide the students step by step through the process of empirical energy economics research. Each week, the course will contribute to the elaboration of a different section of the term paper. Therefore, the structure will follow the research process from the selection of a research question, the exploration and cleaning of data, the identification strategy and the selection of econometric methods, their concrete implementation in statistical code, the critical interpretation of results, to the oral and written communication of these results.

**Part 1: Core Econometric and Data Skills**

The first part is about the data skills mentioned above and will also include a review of econometrics with a focus on practical implementation in a statistical software. In this section we will look at finding and exploring energy data as well as the design of a research question.

**Part 2: Methods for Empirical Analysis**

This part the course will expose student to various econometrics methods applied on energy topics that can help to develop and enhance the analysis of the student’s research project. In this section we will discuss a selection of the scientific literature that provide examples to guide the writing of term papers.

**Part 3: Communication of Results**

This part is about written, and oral communication of empirical results tailored for different audiences.

Students develop and demonstrate the course learning outcomes through zoom participation, exercises, completion of a major research paper and presentation of research findings. Students are required to read and study a number of important empirical energy economic papers and be able to provide critical review and discussion. Exercises require computer application of empirical energy economic problems. Students are required to demonstrate proficiency in computer coding, application of econometric skills and critical interpretation of econometric results.

**Required Textbook(s):**

None

**Recommended Textbook(s):**

Any textbook from your previous econometrics’ courses. Such as:

- Jeffrey M. Wooldridge, *Introductory Econometrics, A modern approach*. (Any Edition)
- Keppler J.H., Bourbonnais, R. & J-M Chevalier, *The econometrics of energy systems*
- Angrist, J.D.& Pischke, J., *Mostly Harmless Econometrics: An Empiricist’s Companion*

**Software:**

Excel and one econometric software of the student’s choice such as Gretl, STATA, or R. Examples will be demonstrated in class using these tools, and the codes will be available. STATA will be available remotely through SS020 lab. [Gretl](#) and [R](#) are freeware available online for download.

**Online Delivery:**

This course will be delivered online. Students are expected to be able to participate online in accordance with this Course Outline. Lectures, assignments, office hours, exams, readings and other course material, etc. all require online access and this access is the responsibility of the student.

In order to remotely participate in online courses, students will need to have: computer with a current and updated operating system (macOS or Windows will work with all university-supported online learning technologies), a current and updated web browser installed – the latest versions of Firefox, Safari, Chrome or Edge will help to avoid compatibility issues, secure and reliable internet, microphone / headphones, webcam (optional), scanner (or camera to scan your work).

### **Desire2Learn:**

This course will make use of the Desire2Learn (D2L) platform. Students who are registered in the course can log on at <http://d2l.ucalgary.ca> through their student centre. Please note that D2L features a class e-mail list that may be used to distribute course-related information. These e-mails go to your University of Calgary e-mail addresses only.

### **Lectures:**

Lectures will be delivered online at the Registrar scheduled times and delivered using ZOOM. The lectures will be recorded and subsequently posted to D2L.

### **Grade Determination Details:**

<b>Deliverables</b>	<b>Deadline</b>	<b>Weight</b>
Weekly applied exercises <sup>1</sup>	Due on Mondays	20%
Research project proposal (PP)	Monday February 8th	10%
Peer feedback on PP <sup>2</sup>	Monday February 22th	5%
Preliminary results (PR)	Monday March 15th	10%
Peer feedback on PR <sup>2</sup>	Monday March 22nd	5%
Video presentation of project <sup>3</sup>	Thursday April 8th	10%
Research term paper	Thursday April 22th	40%
		100%

<sup>1</sup> Weekly short, applied exercises will be given only in the first part of the course.

<sup>2</sup> Peer feedback is a constructive input on another student's project.

<sup>3</sup> Video presentations present succinctly the motivation, analysis, and findings of the project.

The official grading system will be used. See <http://www.ucalgary.ca/pubs/calendar/current/f-1-1.html>.

**A passing grade on the Research Term Paper and the Video Presentation are required to pass the course.**

As per the Writing Across the Curriculum Statement in the Calendar, writing and grading thereof will be a factor in the evaluation of student work. See <https://www.ucalgary.ca/pubs/calendar/current/e-2.html>.

Course material dealing with a particular assignment will typically be covered in class at least 5 days before the assignment is due; thus, assignments can be completed at any time up to and including the due date. Given these factors, only situations where someone can document illness or domestic affliction for an extended period (i.e., the entire 5 days prior to the due date) would possibly warrant shifting the assignment weight to the final exam. Furthermore, technical problems can be expected to occur with computer systems (and internet availability) so it may be a good idea to not wait until the last minute to submit your assignment.

All other course components will also be accessed, submitted, and returned through D2L.

HERE WILL BE NO MAKEUP OR DEFERRED QUIZZES/TESTS/EXAMS under any circumstances, nor may the quizzes/tests/exams be written early. Students unable to write the quizzes/tests/exams because of documented illness, family emergency, religious observance, or university-sanctioned event will have the weight shifted to the final examination; otherwise a grade of zero will be assigned.

**Reappraisal of Grades and Intellectual Honesty:**

*For Reappraisal of Graded Term Work, see Calendar I.2*

<http://www.ucalgary.ca/pubs/calendar/current/i-2.html>

*For Reappraisal of Final Grade, see Calendar I.3*

<http://www.ucalgary.ca/pubs/calendar/current/i-3.html>

**ACADEMIC MISCONDUCT**

Academic Misconduct refers to student behavior that compromises proper assessment of students' academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

Student committing academic misconduct during the final exam will not receive a passing grade on the course.

For information on the Student Academic Misconduct Policy and Procedure please visit:

<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf>

<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf>

Additional information is available on the Academic Integrity Website at <https://ucalgary.ca/student-services/student-success/learning/academic-integrity>.

**Academic Accommodations:**

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services. SAS will process the request and issue letters of accommodation to instructors. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>.

**Freedom of Information and Protection of Privacy (FOIP) Act:**

Personal information is collected in accordance with FOIP. Assignments can only be returned to the student and will be accessible only to authorized faculty and staff. For more information, see

<http://www.ucalgary.ca/legalservices/files/legalservices/faq-students.pdf> and

[http://www.ucalgary.ca/legalservices/files/legalservices/faq-faculty\\_0.pdf](http://www.ucalgary.ca/legalservices/files/legalservices/faq-faculty_0.pdf).

**Copyright Legislation:**

See the University of Calgary policy on Acceptable Use of Material Protected by Copyright at <https://www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright-policy.pdf>. Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

**Recording of Lectures:**

Recording of lectures is prohibited, except for audio recordings authorized as an accommodation by SAS or an audio recording for individual private study and only with the written permission of the instructor. Any unauthorized electronic or mechanical recording of lectures, their transcription, copying, or distribution, constitutes academic misconduct. See <https://www.ucalgary.ca/pubs/calendar/current/e-6.html>.

**Important Dates:**

Please check: <http://www.ucalgary.ca/pubs/calendar/current/academic-schedule.html>.

**Student Organizations:**

Faculty of Arts Students' Association (F.A.S.A.):

Economics Department Representative

E-mail: [econrep@fasaucalgary.ca](mailto:econrep@fasaucalgary.ca) and Web: [www.fasaucalgary.ca](http://www.fasaucalgary.ca).

Society of Undergraduates in Economics:

<https://www.ucalgarysue.com/>.

Society of Undergraduates in Economics is a student run organization whose main purpose is to assist undergraduate economics students to succeed both academically and socially at the University of Calgary. Services include access to the exam bank, career events such as Industry Night and information sessions, mentorship programs, and social events for members. They invite you to join by contacting SUE at [societyofundergradsineconomics@gmail.com](mailto:societyofundergradsineconomics@gmail.com).

**Faculty of Arts Program Advising and Student Information Resources:**

- Have a question, but not sure where to start? The Arts Students' Centre is your information resource for everything in Arts! Call them at 403-220-3580, or email them at [artsads@ucalgary.ca](mailto:artsads@ucalgary.ca). You can also visit the Faculty of Arts website at <http://arts.ucalgary.ca/undergraduate>, which has detailed information on common academic concerns, including program planning and advice.
- For registration (add/drop/swap), paying fees and assistance with your Student Centre, contact Enrolment Services at 403-210-ROCK [7625].

**Student Support and Resources:**

- See <https://www.ucalgary.ca/registrar/registration/course-outlines> for information on campus mental health resources, the Student Ombuds' Office, Student Success Centre, Safewalk, and Emergency Evacuation and Assembly.
- Online writing resources are available at <https://ucalgary.ca/student-services/student-success/writing-support>.

**Notes:**

1. Students are responsible for all assigned material, e.g., supplementary material posted on D2L, regardless of whether or not the material was covered in class.
2. Emails addressed to the lecturer must include the following elements:
  - 2.1. The title of the course in the subject. Ex: *ECON493-Question on the research proposal*
  - 2.2. A signature clearly identifying the sender
3. Files uploaded must include 1-family name, and 2-assignment title. Ex: *Lavoie-Research Proposal.pdf*
4. Camera must be ON during group discussions when in Zoom breakout rooms.

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