Course Description:

Course Learning Outcomes:
Students will understand issues in natural gas supply (including exploration, storage, transportation, pricing, and local distribution) and demand (including environmental externalities, and substitutes for natural gas use). Students will gain expertise in conducting literature reviews and use economics to evaluate policies.

a. Understand natural gas markets, from exploration and development, to transmission, distribution, and end use.
b. Introduce theory of extraction of exhaustible resources.
d. Introduce natural gas transportation networks and how this impacts natural gas pricing and policies.
e. Develop theory of price ceilings. Introduce allocative costs of price ceilings and the historical context of inefficient regulations. Empirical literature on estimating the size of the inefficiency.
g. Gain expertise in synthesizing information from the academic literature.

Tentative Course Outline:

1. Overview

**Alberta's Natural gas overview: [https://www.alberta.ca/natural-gas-overview.aspx](https://www.alberta.ca/natural-gas-overview.aspx)
Natural Resources Canada's Natural Gas Primer:  https://www.nrcan.gc.ca/energy/natural-gas/5641


Natural Resources Canada's Natural Gas Facts:  https://www.nrcan.gc.ca/energy/facts/natural-gas/20067#details-panel4

“Natural Gas Liquids Primer – With a Focus on the Appalachian Region” US Dept of Energy, June 2018
(page 2 has table of uses for natural gas liquids; page 33 describes ethylene crackers).

"Alberta at a Crossroads: Royalty Review Advisory Panel Report"


2. Production: upstream exploration and extraction

***  Chapter 2 from Markets and the Environment by Keohane Olmstead

***  Chapter 6 from Markets and the Environment by Keohane Olmstead


***  (Introduction 1092-1093, Figure 5, Table 6): Jacobsen, Grant D. and Dominic P. Parker "The Economic Aftermath of Resource Booms: Evidence from Boomtowns in the American West" Economic Journal (2014)


Jennifer Winter, "Buying Anonymity: An Investigation of Petroleum and Natural Gas Lease Auctions" (Pages 1-9)

3. Production: regulations on rule of capture, unitization, and offset wells


** (Section 2a-c) Fitzgerald, Timothy. "Regulatory Obsolescence Through Technological Change in Oil and Gas Extraction." Wm. & Mary Envtl. L. & Pol'y Rev. 43 (2018): 137.

Ballem, John, The Oil & Gas Lease in Canada, 2019, (Chapter 9 Drainage and Chapter 10 Unitization)


4. Methane emissions

*** Chapters 8 and 9 of Markets and the Environment by Keohane Olmstead

*** (pages 1–3, Fig 4, Fig 5, Table 3): Lade, Gabriel, and Ivan Rudik, "Costs of Inefficient Regulation: Evidence from the Bakken," Journal of Environmental Economics and Management


(MAC curves) "Economic Analysis of Methane Emission Reduction Opportunities in the U.S. Onshore Oil and Natural Gas Industries"


Figure 2, "A Techno-Economic Analysis of Methane Mitigation Potential from Reported Venting at Oil Production Sites in Alberta"


"Incremental CH4 and N2O mitigation benefits consistent with the US Government's SC-CO2 estimates" Alex L. Marten, Elizabeth A. Kopits, Charles W. Griffiths, Stephen C. Newbold & Ann Wolverton, Climate Policy
5. End-of-life issues


"All’s Well that Ends Well: Addressing End-of-Life Liabilities for Oil and Gas Wells" (Page 3, Figure 1)
Muehlenbachs "80,000 Inactive Oil Wells: A Blessing or a Curse?" SPP Briefing Paper, 2017.

6. Natural gas pricing


7. Consumption: natural gas in the electricity sector


8. Natural gas transportation

(Section 2) "Linking Natural Gas Markets – Is LNG Doing its Job?" Anne Neumann, Energy Journal, 2009

(Page 18-20) "Energy Primer A Handbook of Energy Market Basics"

9. Consumption: demand elasticities and effect of price ceilings


10. Consumption: current and future household consumption

Davis, Lucas W. *What Matters for Electrification?* Blog post


11. Consumption: natural monopoly regulation

***Chapters 11 and 12 of *Economics of Regulation and Antitrust* by W. Kip Viscusi, Joseph E., Jr. Harrington, , and John M. Vernon, (scroll to page 401 in section II ECONOMIC REGULATION)

*** (sections 1 and 4): Muehlegger, Erich; Davis, Lucas W "*Do Americans consume too little natural gas? An empirical test of marginal cost pricing*" *The RAND Journal of Economics* 2010

Prerequisites/corequisites:
Economics 201.

Required Textbook(s):
None

Recommended Textbook(s):
Keohane and Olmstead, *Markets and the Environment* (Available at the library)

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](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.

Grade Determination and Final Examination Details:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIDTERM EXAM (FEB 17)</td>
<td>30%</td>
</tr>
<tr>
<td>ASSIGNMENTS</td>
<td>20%</td>
</tr>
<tr>
<td>CLASS PARTICIPATION</td>
<td>5%</td>
</tr>
<tr>
<td>FINAL EXAMINATION</td>
<td>45%</td>
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<td></td>
<td>100%</td>
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</tbody>
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The official grading system will be used. See [http://www.ucalgary.ca/pubs/calendar/current/f-1-1.html](http://www.ucalgary.ca/pubs/calendar/current/f-1-1.html).

A passing grade on minimum of 50% of the course work is required for a student to pass the course as a whole.
If a student’s letter grade on the final exam exceeds their midterm(s) letter grade, the weight of the midterm(s) is (are) transferred to the final exam at the discretion of the instructor. The student must have written the midterm(s) or provided supporting documentation for the absence(s) such as a medical note or statutory declaration.

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.

Any student work which remains undistributed after the last day of classes will be available to students through the instructor’s office during the instructor’s office hours.

The final examination will be comprehensive, scheduled by the Registrar, held in a classroom, and last 2 hours. If a student cannot write their final exam on the date assigned by the Registrar’s Office, they need to apply for a deferred exam https://www.ucalgary.ca/pubs/calendar/current/g-6.html. Under no circumstance will this be accommodated by the Department.

Tests and exams will not involve multiple choice questions.

Programmable calculators, cellphones, textbooks, course notes, and other electronic devices will not be allowed during the writing of tests or final examinations. Students are reminded that simply being able to access their cellphone during an exam is academic misconduct.

The in-class midterm will be held on February 17.

THERE 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:**

*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 for the course.

For information on the Student Academic Misconduct Policy, Procedure and Academic Integrity, please visit: https://www.ucalgary.ca/pubs/calendar/current/k-3.html

**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 https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure

**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 https://www.ucalgary.ca/legal-services/access-information-privacy

**Copyright Legislation:**
See the University of Calgary policy on Acceptable Use of Material Protected by Copyright at https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy 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
Website: www.fasaucalgary.ca.


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.

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! Drop in at SS102, call them at 403-220-3580, or email them at 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] or visit them in the MacKimmie Tower.

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.

LM
2021-11-30