# EBGN 521: Microeconomics of Mineral and Energy Markets, Spring 2019

Jared Carbone

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## Contents



## 1 Logistics

- Class meetings: MW, 9:30-10:45a, Engineering Hall 211
- Office hours: MW, 11a-1p or by appointment
- Contact info: Email: jcarbone@mines.edu, Phone: x2175, Office: EH 311
- Course website: `http://www.mines.edu/~jcarbone/EBGN_521_s19/`[1]

[1] I do not typically use Canvas for anything except keeping you abreast of your grades in the course. All course materials will be administered through the course webpage.

## 2 Description

This is a course in applied microeconomic theory. It concentrates on the behavior of individual agents in the economy (consumers and producers) in response to change in prices and other features of the economic environment, how they interact in markets, and how to apply this theory to the study of natural resource and energy markets. Prerequisites: Principles of Microeconomics, MATH111, MATH530, EBGN509, EBGN510; or permission of instructor.

## 3 Student learning outcomes

At the conclusion of the class students will...

1. Describe the various models of production in mineral and energy markets
2. Distinguish between competitive and non-competitive markets
3. Create models of production
4. Demonstrate the competence to use microeconomic models and tools in subsequent MEE classes
5. Learn how to evaluate the assumptions underlying standard microeconomic models as they apply to mineral and energy markets.

## 4 Brief list of topics covered

1. Economic models
2. Production and supply
3. Derived demand
4. Consumer theory and utility maximization
5. Partial equilibrium competitive markets
6. Game theory
7. Market power
8. General equilibrium in competitive markets

# 5 Format

## 5.1 Readings and problem sets

The chapters in the Varian textbook listed in the course schedule (below) should be read prior to lecture. In addition, I may periodically assign readings from other books and articles. These reading assignments will be posted on course webpage at least a week in advance of day they are due. I will post my slides after each lecture to aid you in your studies. The problem sets are a critical tool for learning how to master the course material. Many of the problem sets are challenging. The best way to learn is to struggle through these assignments and do them yourself in their entirety. You may consult your classmates or me if you get stuck but it is in your own best interest to spend a few hours on your own with the problem set before you resort to these options.

The answers to the problem sets should be submitted as hard copy to me at the beginning of the class meeting at which they are due. *Homework will not be accepted if turned in late.* If there are exceptional circumstances that prevent you from following this protocol, you must make arrangements with me in advance of the posted due date.

## 5.2 Evaluation

- Problem sets (40% collectively and equally weighted)
- Two midterms and final exam (60% collectively and equally weighted)

## 5.3 Grading Procedures

Assignments are marked on a numerical (percentage) basis, then converted to letter grades. The course grade is then calculated using the weights indicated above. As a guide to determining standing, the following letter grade equivalence will generally apply:

| | | | | | |
|---|---|---|---|---|---|
| A | 93-100 | B- | 80-82 | D+ | 67-69 |
| A- | 90-92 | C+ | 77-79 | D | 60-66 |
| B+ | 87-89 | C | 73-76 | F | $<60$ |
| B | 83-86 | C- | 70-72 | | |

Students must successfully complete all components of the course to successfully complete the course. At the instructor's prerogative, remedial

assignments for partial credit may be requested of students who have attempted term work without achieving passing grades. Any work which is not attempted and submitted will be assigned a grade of zero.

There is a final exam for this course that will scheduled during the exam period.

Notes: Students seeking reappraisal of a piece of graded term work (term paper, essay, etc.) should discuss their work with the Instructor within 15 days of the work being returned to the class.

### 5.4 Coursework Return Policy:

Graded coursework will be returned to students within two weeks of the date it is submitted for evaluation.

### 5.5 Absence Policy (e.g., Sports/Activities Policy):

You decide how to best make use of your time. If you have a university-sanctioned excused absence that prevents you from completing a scheduled exam or assignment, I will simply omit it from your final grade, placing added weight on the remaining assignments and exams. There are no make-up assignments.

## 6 Materials

### 6.1 Required text

- Hal R. Varian (1992) Microeconomic Analysis, W.W. Norton & Company, Inc.: New York.

### 6.2 Other useful texts

- Hal R. Varian (1999) Intermediate Microeconomics, W.W. Norton & Company, Inc.: New York.
- Walter Nicholson and Christopher Snyder (2012), Microeconomic Theory: Basic Principles and Extensions, 11th edition, South-Western.
- Brian Binger and Elizabeth Hoffman (1997), Microeconomics with Calculus, 2nd edition, Addison Wesley. (out of print)
- Alpha C. Chiang and Kevin Wainwright (2005), Fundamental Methods of Mathematical Economics, 4th edition, New York: McGraw-Hill.

Course materials distributed via the course website or as books on reserve at Arthur Lakes Library.

# 7 Outline and readings

This list is preliminary. I reserve the right to modify the readings and topics if I feel it is in the best interest of the class. Below I have indicated the chapters from the Varian textbook which each section of the course will cover. Additional readings will be posted on the course website at least a week in advance of the due dates.

## 7.1 Introduction (1/9)

## 7.2 Production technology and firm behavior (1/14-2/13)

**Topics and readings:**

- Technology, Varian, Ch. 1 (1/14-1/16)
- Profit Maximization, Varian, Ch. 2 (1/23-1/28)
- Profit Function, Varian, Ch. 3 (1/30)
- Cost Minimization, Varian, Ch. 4 (2/4-2/6)
- Cost Function, Varian, Ch. 5 (2/11)
- Duality, Varian, Ch. 6 (Feb. 2/13)

**Assignments and other materials:**

- Notes on technology from 1/14
- My ERCOT isoquant
- Isoquant GAMS code
- Isoquant R code

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*MLK Day Break - 1/21*
*President's Day Break - 2/18*
*Midterm 1 - 2/20*

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### 7.3 Consumer theory and empirical practicalities (2/25-3/11)

**Topics and readings:**

- Utility Maximization, Varian, Ch. 7 (2/25-2/27)
- Econometrics, Varian, Ch. 12 (3/4)
- Applications, TBD (3/6-3/11)

**Assignments and other materials:**

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*No class: 3/13*

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### 7.4 Market equilibrium (3/18-4/10)

**Topics and readings:**

- Competitive Markets, Varian, Ch. 13 (3/18-3/20)
- Monopoly, Varian, Ch. 14 (4/1)
- Game Theory and Oligopoly, Varian, Ch. 15-16 (4/3)
- Applications, TBD (4/10)

**Assignments and other materials:**

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*Spring Break - 3/23-3/31*
*Midterm 2 - 4/8*

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### 7.5 General equilibrium (4/15-5/1)

**Topics and readings:**

- Exchange, Varian, Ch. 17 (4/15-4/17)
- Production, Varian, Ch. 18 (4/22-4/24)
- Applications, TBD (4/29-5/1)

**Assignments and other materials:**

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*Final Exam - TBA.*

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# 8 University policies

## 8.1 Policy on disability support

The Colorado School of Mines is committed to ensuring the full participation of all students in its programs, including students with disabilities. If you are registered with Disability Support Services (DSS) and I have received your letter of accommodations, please contact me at your earliest convenience so we can discuss your needs in this course. For questions or other inquiries regarding disabilities, I encourage you to visit `http://disabilities.mines.edu` for more information.

## 8.2 Policy on academic integrity/misconduct

The Colorado School of Mines affirms the principle that all individuals associated with the Mines academic community have a responsibility for establishing, maintaining and fostering an understanding and appreciation for academic integrity. In broad terms, this implies protecting the environment of mutual trust within which scholarly exchange occurs, supporting the ability of the faculty to fairly and effectively evaluate every student's academic achievements, and giving credence to the university's educational mission, its scholarly objectives and the substance of the degrees it awards. The protection of academic integrity requires there to be clear and consistent standards, as well as confrontation and sanctions when individuals violate those standards. The Colorado School of Mines desires an environment free of any and all forms of academic misconduct and expects students to act with integrity at all times.

Academic misconduct is the intentional act of fraud, in which an individual seeks to claim credit for the work and efforts of another without authorization, or uses unauthorized materials or fabricated information in any academic exercise. Student Academic Misconduct arises when a student violates the principle of academic integrity. Such behavior erodes mutual trust, distorts the fair evaluation of academic achievements, violates the ethical code of behavior upon which education and scholarship rest, and undermines the credibility of the university. Because of the serious institutional

and individual ramifications, student misconduct arising from violations of academic integrity is not tolerated at Mines. If a student is found to have engaged in such misconduct sanctions such as change of a grade, loss of institutional privileges, or academic suspension or dismissal may be imposed.

The complete policy is online.

### 8.3 discrimination, harassment and Title IX

All learning opportunities at Mines, including this course, require a safe environment for everyone to be productive and able to share and learn without fear of discrimination or harassment. Mines' core values of respect, diversity, compassion, and collaboration will be honored in this course (More information can be found here) and the standards in this class are the same as those expected in any professional work environment. Discrimination or harassment of any type will not be tolerated. As a participant in this course, we expect you to respect your instructor and your classmates. As your instructor, it is my responsibility to foster a learning environment that supports diversity of thoughts, perspectives and experiences, and honors your identities. To help accomplish this:

Course rosters are provided to the instructor with the student's legal name. I will honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. If something is said or done in this course (by anyone, including myself) that made you or others feel uncomfortable, or if your performance in the course is being impacted by your experiences outside of the course, please report it to:

- Me (if you are comfortable doing so)
- Wellness Center Counseling (`https://www.mines.edu/counseling-center/`)
- Speak Up (`https://www.mines.edu/speak-up/`) - Anonymous Option

In this course, we will cultivate a community that supports survivors, prevents interpersonal violence, and promotes a harassment free environment. Title IX and Colorado State law protects individuals from discrimination based on sex and gender in educational programs or activities. Mines takes this obligation seriously and is committed to providing a campus community free from gender and sex-based discrimination. Discrimination, including sexual harassment, sexual violence, stalking, and domestic violence, is prohibited and will not be tolerated within the Mines campus community.

If these issues have affected you or someone you know, you can access the appropriate resources here: `http://www.mines.edu/title-ix/`. You can also contact the Mines Title IX Coordinator, Karin Ranta-Curran, at 303-384-2558 or krcurran@mines.edu for more information.

It's on us, all of the Mines community, to engineer a culture of respect.