

**Economics 4535**  
**Natural Resource Economics**  
**Spring 2021**

**Instructor:** Billy Mertens

**Office:** Zoom: <https://cuboulder.zoom.us/j/5838330659>

**E-mail:** [mertens@colorado.edu](mailto:mertens@colorado.edu) Email is by far the best way to contact me. I check my email and respond (if time) every T,R and most M,W,F between 8:30 and 9am. If there is not enough time to respond to all emails during that time, then I will respond in the afternoon between 3:35 and 4pm. I typically do not check emails over the weekend, but we can set up times to Zoom over the weekend.

**Web:** [canvas.colorado.edu](http://canvas.colorado.edu)

**Office Hours:** M 9-9:30a; W 10-11a; T,R 9-9:30a & 11:30a – 12:30p, and by appointment (please give 5 days' notice for appointments). Because of COVID restrictions, all office hours will be on Zoom (link above).

### **Course Description**

This course is designed to give you an introduction to the implications of natural resources as economic concepts. It presents theories of efficient utilization of natural resources and discusses issues related to current practices of use of resources. Those practices are constantly changing, so we focus on the skills to analyze any set of policies. We will study natural resources used in the economy, the value of natural resources to society, and the allocation of renewable and non-renewable resources. We also discuss issues of sustainability, conservation, and preservation. The course extensively uses graphical analyses and some mathematical models. In addition to learning about the methods that economists use to analyze natural resource problems and issues, you will be challenged to frame problems in economic terms and propose solutions to these problems.

A much more detailed outline of covered material is posted separately.

### **Prerequisites**

Students must have completed ECON 1078, 1088, 2010, 2020, **3070** and 3818. I assume that you did not only take the class, but also that you understand and remember the content. It is **very** important that you fulfill the prerequisite **before** you take this course, and **still** understand the materials in the prerequisite. If you have any uncertainty as to whether you are under or over qualified to take the course, please talk to me ASAP. The prerequisites must be strictly enforced.

I will use calculus in the course. Materials learned in 3070 will form a foundation for what we will do in 4535. I will cover the relevant micro theory in my lectures but cover it more quickly than when it was presented to you in intermediate microeconomic theory. It is important that you have successfully completed Intermediate Micro Theory. If you are an environmental studies major who has doubts about their knowledge of economics, talk to me—soon.

While this is not a micro-theory course, economics without theory is not economics. You will need micro theory to understand and explain the allocation of natural resources. Some of the theory and terms you will need to know include: the *theory of the firm*, the *theory of the consumer*, *efficiency*, when the market equilibrium will and won't be efficient, *market failure*, types of market failures, corrections for market failure, *discounting* and *present value*, *public goods*, *property rights*, *common property*, *externalities*.

A strong math background will make this course easier. Math involves rigor and a way of thinking that facilitates economic thinking. In addition, graphs and simple mathematical descriptions of economic problems provide insights that would be difficult to convey with only words.

### **Prerequisite Quiz**

To be sure you are prepared for the material to be covered in this course, you will take a preliminary quiz. The quiz will cover some basic economics and calculus, as well as many of the concepts we will cover in the course. The quiz will be open notes, so you can use any resources you have acquired in previous classes (those from Econ 3070 will be especially useful). You must score 70% or higher on the quiz to avoid having to take another quiz. The quiz *may* (but likely won't) have an impact on your overall grade.

### **Policy on Cheating:**

**If you are suspected of cheating, I will immediately and without notification forward your case to the honor code office. This is actually the fairest way to proceed. In these instances, if I took it upon myself to make the decision of whether you violated the honor code, there could be bias involved. The honor code council has both students and faculty members, and they are trained to deal with these types of situations. I will accept the honor code decision as final. If the honor code finds that you did not violate the code, then there will be no repercussions, and all grades will be entered based on your submitted work. If you are found to have violated the honor code (see below), by both the honor code council and I, you will automatically fail the course!**

### **Electronics in the Classroom**

Laptops, tablets, and even phones can actually play a role and benefit learning in many types of classes. There are many pros and cons to allowing consistent use of these devices during the class period. However, it has become abundantly clear to me that these devices are more of a distraction than a learning aid in most situations. In addition, taking notes by hand has actually been shown to be [more effective than taking them on a laptop or tablet.](#), and use of devices has been shown to [lower not only the grades of the users, but also of the surrounding students.](#) Therefore, electronic devices will NOT be allowed in the classroom (this includes cell phone use for texting, etc.). **You especially cannot use any form of electronic device during Group-Led Discussions or Group Assignments (it defeats the purpose of working together). You should take a calculator to class on Group Assignment days and put your phone completely out of sight!** If you are expecting an important call or text, then simply put your phone on vibrate, sit near the door, and step out when the call/text comes through. Otherwise, keep your phone in your pocket/bag, and **not** on your desk (or I may ask you to put it away or leave the class). Of course, if you have a disability services related need for these devices they will be allowed – in that case notify me of your exception ASAP. Some people write out their notes into a tablet; in this case an exception may be made – again notify me ASAP.

This term, all of our in-class time will be devoted to the group assignments and GLDs, so please take a calculator (not your phone) with you to class.

### **Required Materials:**

1. The required text for this course is “Environmental and Natural Resource Economics” by Tietenberg and Lewis (T&L) is pretty good. The T&L text has enough relevant material that I have specified the corresponding chapters in the course outline. We will skip around and omit some material (especially the material targeted to the environmental class), and some of what will be covered is above this text. We will spend extra class time on that more difficult material. There will be additional assigned readings for nearly every topic we cover. These readings will be posted separately on the course website.
2. You will need a 4-function or financial (not a graphing) calculator for some exams.
3. Your face-covering (see COVID requirements below)

### **Class format**

It’s another COVID semester – and hopefully the last one! Fortunately, we will be able to meet in person starting mid-February. Over the past several years, consistently the best feedback for this course has been about the group assignments we do in class. For this reason, I want to devote most of the time that we can spend in-person doing those assignments. I feel that you really get the most out of class by interacting and problem-solving (with guidance). We will also do some Group-Led-Discussions/Presentations in-class.

We will go over all course scheduling in detail during the first week of class (on Zoom). You should also check the “Course Outline” link in Canvas. **Do NOT simply go by the “Canvas Calendar Feed”.**

The first portion of the course will be a fairly basic introduction to the tools used in analyzing natural resource issues. We will then cover some general natural resource topics, and analysis techniques. Finally, we turn to applied problems, and public policy issues.

There are more policies regarding COVID listed in the “Additional Notes” near the end of this syllabus.

### **Zoom:**

During general lectures, I do not require that you have your audio turned on, but you do need to have your video on. If for some reason you are having issues with your video, please contact me in advance of class, and let me know your plans and timeline for getting the video issues resolved. For all GLDs, and for any group-assignments that we may end up having to do through Zoom, or for some sort of replacement for these assignments done on Zoom (if in-person classes are eliminated by the university), I will require that you keep both your audio and video on. It is very important that people be able to see and hear you in a discussion setting. **In order to receive credit on GLD and Group Assignment Days done on Zoom, you must have a working mic and video.**

### **A Note on Learning Systems and Assessments**

Please note that all exams will be semi-cumulative, and we will spend at least a little time reviewing for each exam and even more time going over the exams in class (on Zoom). A little more detail on learning systems is given below:

### Learning systems:

1. Lecturing: explaining difficult material not easily learned on your own with text, groups, etc.
2. Exams: exams should be learning tools as well as assessment tools! We will go over each exam in depth in class. Reviewing exams is one area where in-class discussion and explanation are most effective. Just reading answers on a key has been shown to be one of the worst ways to learn material. Therefore, exam reviews will be the one area of class where **no** notes, associated pictures or keys will be posted. But during this pandemic period, we will be going over the exams on Zoom, and those sessions will, of course, be recorded and posted.
3. Group-Led-Discussions: we will cover both classic and more recent relevant articles from scholarly journals. The more creative you can be with these, the more you will get out of them (and the better will be your grade). Finding interesting ways to engage the class in discussion of these articles will teach you critical skills that will not only solidify the current information but will also aid in your learning for other classes. Presentation of material is one of the most instructive learning systems because:
  - a. *If you are going to inform others about what you know, you must first fully understand it yourselves. If you cannot explain a concept to others you may not fully understand it yourself.*
  - b. *You must research the topic, which may expose you to new ideas and sources of material. These sources could help in other coursework.*
  - c. *Most “real-world” careers require some form of presentation skills.*
  - d. *You will start to learn how to defend specific points of view in front of others. This is a critical professional skill!*
  - e. *Help you learn to organize information in a clear & concise way. Your audience will want to hear the most relevant information in the most clear and understandable fashion.*
  - f. *Help you learn presentation tools, formats and devices.*
  - g. *You learn how to practice presentations and fit information into a set time period (very important in business).*
  - h. *You can discern what it takes to teach others.*
  - i. *It will teach you how to respond to critical questions in front of others.*
  - j. *Learn to analytically and reasonably justify a specific economic rationale.*
4. Group scholarship: we will work some practice problems in groups, which can help your understanding of the material whether you already understand it fairly well or are struggling a bit. The Group-Assignment dates are listed in the course outline – do **not** miss these days! Given the current situation, there are alternatives to the group assignments if you cannot come to class.
5. Discussion: discussing the articles we cover will help make the information more concrete and add to long-term learning.
6. Self-study: reading the articles and solving the review questions.

### Assessment systems:

1. Cumulative Exams: shown to improve learning more than virtually every other technique. As noted above, exams are a part of the learning process, not just a part of assessment – we will go over every exam (except, unfortunately, the final) in class (on Zoom). *It is important to review and relearn the material as we build upon that information. This increases long-term learning!* There will be three exams and a cumulative final. All exams are somewhat cumulative, and the material does build on itself, so it is important to understand all of the concepts as we go.

2. Group-Led Discussion: to give incentives for giving high quality discussions and informing the class, these will be graded.
3. Quizzes on Article Readings: to motivate actually reading the articles. Since this is an upper-level course involving much discussion, your quiz grade can be improved by your efforts to add to that discussion. This is a “be here” class (this term that means being present either in person, or virtually – communication is key!). If you put in the effort, you will do well. If you prefer a class where you can just get the notes, skip a lot of classes and take some tests, then another course would be more appropriate.
4. Group assignments will account for part of your grade (see below).

### ***More Information on Assessment:***

#### **Exams**

There will be three cumulative exams and a cumulative final. These will be given in class on the days listed. No exams will be dropped. To be fair to everybody, I will not answer ANY questions during exams (even about typos) – this puts everyone on equal footing during the exams. Tests will consist of short-answer questions and some longer problems. The exams will all be cumulative, and the material does build on itself, so it is important to understand all of the concepts as we go. **Exams will be given in class on the days listed. If you miss an exam with a valid excuse (e.g. illness), then the weight of your final will be increased. Note that the exam dates below are not tentative – exams will be given in class on the days listed. NO EXAMS WILL BE DROPPED!!**

#### **Exam Schedule: *all exams will be taken in class!***

Exam I: Tuesday, February 16<sup>th</sup> (or February 18<sup>th</sup>)

Exam II: Thursday, March 18<sup>th</sup>

Exam III: Thursday, April 22<sup>nd</sup>

Final exam: Monday, May 2<sup>nd</sup> at 4:30pm in our usual classroom

#### **Final Exam Conflicts**

Official University Policy states that: If you have three or more final exams scheduled on the same day, you are entitled to arrange an alternative exam time for the **last** exam or exams scheduled on that day. **To qualify for rescheduling final exam times, you must provide evidence that you have three or more exams on the same day, and arrangements must be made with your instructor no later than the standard last day to drop a course.**

#### **Group Assignments:**

These cooperative learning exercises (detailed above) are extremely important. The group assignment dates are listed in the course outline. It is important not to miss these days without an excused absence. **The object of these assignments is to work together and engage your brains in the learning process. The goal is NOT to try and finish the assignments quickly, or in most cases, to even finish them at all. You will receive a passing score of 75% just for being present and working on the in-class problems with your group. Also, any group-work that you submit with the names of all members of your group listed by last name in alphabetical order, will receive an additional 10%. Any day that no cell phone of any member of your group is visible, your group will receive an additional 10%. Additionally, I will sometimes have a random member of a random group demonstrate a problem at the board, and if you are a member of the group that presents, it can raise your grade for that assignment.**

### **Group-Led Article Discussions (optional), Quizzes and Participation**

We will review several relevant academic articles on different issues in natural resource economics. You will be required to understand these articles, and you will work in teams to present and lead a discussion on one of the articles. When you are not in the discussion-leading group you are still expected to have read the article and there will be a short quiz.

Your goal with the group-led discussions is to make one article of your choosing very understandable to the class. The class will have read the article (there will be a short quiz on the readings that will count toward the final grade), so it is your job to make the paper even more clear, and primarily to motivate a successful discussion about the article. You should try and answer questions as the author would. It is not your job to critique the article – all of the articles have already been critiqued by PhD referees before being published. However, if you find follow-up articles that critique the paper it is fine (and even encouraged) to cite those articles. The groups leading the discussion will have studied their paper in great detail, but I expect the rest of the class to have read all of the papers and be ready to discuss them – rude and counter-productive behavior such as texting and having your laptop open during class discussion will severely damage your own presentation or participation grade.

The class will take a roughly 10-minute quiz at the beginning of the hour to be sure everyone is ready to discuss, and during that time, you will set-up and prepare your discussion (you get 125% for that day's quiz!). Participation/discussion on GLD days will add to your quiz grade.

You should be able to keep the class engaged in discussion for 35 to 45 minutes (35 minute minimum; if you think you might need more than 45 minutes, just let me know in advance). **You will be graded down if you cannot keep the class engaged in an interesting and informative discussion about the paper for that time. If you choose to have an activity or game as a part of your GLD, it is important to have that activity portray what is being explained in the article (there should not be much uncertainty, unless the paper calls for it).** I will also discuss some major points of the paper after the GLD on the following class day. More guidance for the GLDs is posted separately.

If you are not leading the GLD that day, then **you cannot use any form of electronic device during Group-Led Discussions (it is rude to those leading the activities). If you use them on those days, you will automatically receive a zero for that day's quiz.** If you are expecting an important call or text, then simply put your phone on vibrate, sit near the door, and step out when the call/text comes through.

There will also be quizzes on some days that we will be covering already posted notes. On those days, you should read the notes in advance and be ready to discuss the topics involved. **On all quizzes, I use the No-Nonsense rule, meaning that if you did not do the required reading, it is better for you to simply state that than to try and guess your way through the quiz.** You may use handwritten (not photocopied) notes of your own for quizzes. Quizzes are given at the beginning of class, so do Not be late!

There will be some minor changes to GLD and quiz procedures this term due to the COVID logistics. We will discuss these (on Zoom) during the first week of class.

### **Attendance Policy**

**You will be administratively dropped if you do not attend each (all) of the first 3 days of class. The only other policy regarding attendance this year is that you continue to stay involved in the**

**class whether we are remote or not. Canvas and Zoom track usage, and there will be assignments due regularly.**

**Weights of Assignments:**

OPTION I

Group Assignments	10%
Group-Led Discussion	10%
Quizzes (and Participation)	8%
Exam I	12%
Exam II	17%
Exam III	19%
Final Exam	24%

OPTION II

Group Assignments	10%
Quizzes (and Participation)	8%
Exam I	18%
Exam II	19%
Exam III	20%
Final Exam	25%

**Incompletes, Extra Credit, etc.**

I adhere strictly to the University guidelines on Incompletes (“An I is given only when students, *beyond their control*, have been unable to complete course requirements. A substantial amount of work must have been *satisfactorily completed* before approval for such a grade is completed.”). Bad grades, unsatisfactory performance, too many credit hours, work conflicts, etc. are not reasons for an incomplete.

**I am adamant about giving each student an equal opportunity to perform well in the course, so there will be no extra credit opportunities that are not offered to the entire class. You should focus your efforts on learning the material and doing well on the exams.**

*Grading Scale:*

<b>Your Score</b>	<b>Grade</b>
92% to 100%	A
90% to 91%	A-
88% to 89%	B+
82% to 87%	B
80% to 81%	B-
78% to 79%	C+
72% to 77%	C
70% to 71%	C-
68% to 69%	D+
62% to 67%	D
60% to 61%	D-
Below 59.5%	F

## **Additional Notes:**

### COVID Requirements

As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements, and public health orders in place to reduce the risk of spreading infectious disease. Required safety measures at CU Boulder relevant to the classroom setting include:

- maintain 6-foot distancing when possible,
- wear a face covering in public indoor spaces and outdoors while on campus consistent with state and county health orders,
- clean local work area,
- practice hand hygiene,
- follow public health orders, and
- if sick and you live off campus, do not come onto campus (unless instructed by a CU Healthcare professional), or if you live on-campus, please alert [CU Boulder Medical Services](#).

Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to [Student Conduct and Conflict Resolution](#). For more information, see the policies on [COVID-19 Health and Safety](#) and [classroom behavior](#) and the [Student Code of Conduct](#). If you require accommodation because a disability prevents you from fulfilling these safety measures, please see the “Accommodation for Disabilities” statement on this syllabus.

All students who are new to campus must complete the [COVID-19 Student Health and Expectations Course](#). Before coming to campus each day, all students are required to complete the [Buff Pass](#). In this class, if you are sick or quarantined, ***please alert me ASAP. You are NOT required to tell me if you believe you have COVID-19. If you do tell me you have COVID-19, I am required to inform health services. Overall, please just stay in communication!***

### Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code ([honor@colorado.edu](mailto:honor@colorado.edu)); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the [Honor Code Office website](#).

### Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu) for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

### Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See the [campus policy regarding religious observances](#) for full details.

### Classroom Behavior

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on [classroom behavior](#) and the [Student Code of Conduct](#).

### Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

### Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#).

Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

**Any University policies that are in conflict with my own policies will supersede my policy!**

A reply from one student to another on the discussion board for one of my colleague's online classes: "If you read the course syllabus you will find the answer to your questions. If you do not understand what you read, I recommend you read multiple times. After reading the syllabus if you still have questions come back and I will try to help you as much as possible."

