AEM 5500:
Resource Economics

(co-meeting with AEM 4500 / ECON 3860: Resource Economics)

Syllabus

Professor:	Professor C.-Y. Cynthia Lin Lawell
Office hours:	TBA, via Zoom
Teaching Assistant:	Tong Wu (tw494@cornell.edu)
Office hours:	(TA office hours begin Thursday, January 26, 2023)
	Mondays 9:30am-10:30am Eastern Time, via Zoom
	Thursdays 5:00pm-6:00pm Eastern Time, Warren Hall 330
Course web site:	Canvas (https://login.canvas.cornell.edu/)
Class time and room:	Mondays 7:30pm-10:30pm Eastern Time, Warren Hall B75

> *This Syllabus will be continually updated throughout the Semester. The Canvas course web site will always have the latest version of the Syllabus for this Semester. For the latest version of Syllabus, please see the Canvas course web site.*

COURSE DESCRIPTION

AEM 5500 introduces students to the economics of renewable and nonrenewable natural resources. Topics covered include the valuation and use of land; water economics, management, and conservation; the extraction and management of nonrenewable resources such as minerals, rare earth elements, and energy resources; renewable and nonrenewable sources of energy; forest management; fishery economics; groundwater; natural resource markets, demand, supply, and scarcity; and sustainability. Students will learn how to use dynamic models to analyze decision-making over time, and to solve dynamic optimization problems analytically and numerically. Students will also learn how to analyze and explain the intuition and logic behind the theory and concepts. Students will apply the methods, quantitative tools, and concepts to analyze natural resource issues at global and local levels; to introspectively reflect on their own lives and future aspirations; to draw lessons and implications for leadership, management, and policy; and to communicate, describe, and explain quantitative analyses through writing, speech, visual information, slides, and video. A solid background in calculus is required.

AEM 5500 co-meets with AEM 4500 / ECON 3860: Resource Economics. Graduate students in AEM 5500 have additional and more advanced learning outcomes and assignments.

Prerequisites:
Enrollment by application only; in order to apply, students should sign up on the wait list, read the syllabus that will be posted on Canvas at the beginning of Spring Semester 2023, register their iClicker remote through Canvas, bring their iClicker remote to both of the first 2 lectures, attend both of the first 2 lectures, submit the first problem set, and apply in person in class. Both (i) Math 1110 (calculus) and (ii) either Econ 3030, AEM 2600, or AEM 5600 (intermediate microeconomics with calculus) must be completed before taking AEM 5500 (and cannot be taken concurrently). For students whose graduate program or concentration requires AEM 2500, (iii) AEM 2500 should be taken before AEM 5500.

Companion courses:
Students are encouraged to also take the following complementary companion courses: AEM 5510 (Environmental Economics) and AEM 5515 (Business and Economics of Energy). AEM 5500 (Resource Economics), AEM 5510 (Environmental Economics), and AEM 5515 (Business and Economics of Energy) can be taken concurrently and in any order.

WAITLIST INFORMATION

Enrollment in this course is by application only. Students who are interested in this advanced upper-level elective course, have fulfilled the prerequisites, and are willing to put in the time and effort to learn the difficult material, actively engage synchronously in lecture, and complete the challenging and time-intensive problem sets and final project are very welcome to apply.

In order to apply, students should sign up on the wait list, read the syllabus that will be posted on Canvas at the beginning of Spring Semester 2023, register their iClicker remote through Canvas, bring their iClicker remote to both of the first 2 lectures, attend both of the first 2 lectures, submit the first problem set, and apply in person in class. All students interested in enrolling in this class are therefore being placed on the waitlist prior to the first lecture; students interested in enrolling in this class should sign up on the waitlist as part of the application process.

Students on the waitlist will have access to the Canvas course website, and will therefore be able to access and submit Problem Set 1 even though they will still be on the waitlist at the time Problem Set 1 is due. The course is by application only, and completing and submitting Problem Set 1 is part of the application process. In particular, in order to apply, students should sign up on the wait list, read the syllabus that will be posted on Canvas at the beginning of Spring Semester 2023, register their iClicker remote through Canvas, bring their iClicker remote to both of the first 2 lectures, attend both of the first 2 lectures, submit the first problem set, and apply in person in class.

Students who are unable to attend or miss either of the first 2 lectures for any reason but would like to apply are encouraged to apply in a future semester. Students who are unable to attend lectures for any reason this semester but would like to apply are encouraged to apply in a future semester. Students who are unable to bring their iClicker remote to both of the first 2 lectures for any reason this semester but would like to apply are encouraged to apply in a future semester. Students who are unable to complete and submit Problem Set 1 for any reason but would like to apply are encouraged to apply in a future semester.

This course is very challenging, time- and work-intensive, and demanding, but also very rewarding for students who are willing to work hard and put in the time and effort to attend and actively engage synchronously in lectures and office hours, learn the difficult material, and complete and turn in all their assignments on time. Students who are unable to put in the time and effort to attend and actively engage synchronously in lectures and office hours, learn the difficult material, and complete and turn in all their assignments on time this semester for any reason but would like to apply are encouraged to apply in a future semester.

Students who have not yet fulfilled the prerequisites but are interested in this course are encouraged to fulfill the prerequisites and apply in a future semester after the prerequisites have been fulfilled. Both (i) Math 1110 (calculus) and (ii) either Econ 3030, AEM 2600, or AEM 5600 (intermediate microeconomics with calculus) must be completed before taking AEM 5500 (and cannot be taken concurrently). For students whose graduate program or concentration requires AEM 2500, (iii) AEM 2500 should be taken before AEM 5500.

LEARNING OUTCOMES

As a result of taking AEM 5500: Resource Economics, students will be able to:

1. Analyze and explain the intuition and logic behind theories and concepts in economics and natural resource economics mathematically, graphically, and in words.

2. Characterize decision-making problems as mathematical optimization problems; use dynamic models to analyze decision-making over time; solve dynamic optimization problems analytically; and solve dynamic optimization problems numerically by computer.

3. Apply methods, quantitative tools, and concepts in economics to analyze natural resource issues at global and local levels; to introspectively reflect on their own lives and future aspirations; and to draw lessons and implications for leadership, management, and policy.

4. Explain, evaluate, and effectively interpret claims, theories, and assumptions related to economics and natural resource economics.

5. Find, access, critically evaluate, and ethically use information on issues related to economics and natural resource economics; and integrate quantitative and qualitative information to reach defensible and creative conclusions on issues related to economics and natural resource economics.

6. Communicate and explain difficult concepts, mathematical methods, quantitative information, and quantitative analyses effectively through writing, speech, visual information, slides, and video.

7. Respectfully articulate the views of people with diverse perspectives on issues related to economics and natural resource economics.

8. Analyze and explain the intuition and logic behind theories and concepts of sustainability from the perspective of economics and natural resource economics.

REQUIRED COURSE MATERIALS

There is no textbook for this class.

Students in this class will use an iClicker remote. One can be purchased at the Cornell Store, or many online sites such as eBay or Craigslist. Any type of iClicker remote will work: iClicker, iClicker+ (both sold at the Cornell Store), or iClicker2 models (not sold at the Cornell Store). Students who have enrolled in CAMP (Cornell Academic Materials Program) can pick up an iClicker remote at the Cornell Store at no charge, as it is included with the CAMP subscription. We will not be using the iClicker Student (formerly iClicker REEF) mobile app. We will not be using the iClicker Student (formerly iClicker REEF) web app.

Students should register their iClicker remote through Canvas.

More information on the iClicker remote is available in the "iClicker Info" module in the "Modules" section of the Canvas course web site.

Students are required to use Excel. Cornell University students are eligible for several different options for Microsoft Office: https://it.cornell.edu/software-licensing/microsoft-office-students

CODE OF CONDUCT

Students are expected to follow Cornell University's Code of Academic Integrity: https://cuinfo.cornell.edu/aic.cfm

COURSE COPYRIGHT

It is Cornell University policy that faculty members own the copyright of the course materials they develop. Lectures and office hours may not be audio recorded or video recorded except by the instructor. Course materials, problem sets, final projects, study and reference guides, lecture recordings, and lecture videos should not be shared, posted, or circulated. Students are not permitted to buy, sell, post, publish, or redistribute any course materials, problem sets, final projects, study and reference guides, lecture notes, lecture recordings, or lecture videos. Such unauthorized behavior is a violation of course copyright and constitutes academic misconduct.

TEACHING PHILOSOPHY

Students in this class will be set to a high standard of excellence. This advanced upper-level elective course is very challenging, time- and work-intensive, and demanding, but also very rewarding for students who are willing to work hard and put in the time and effort to attend and actively engage synchronously in lectures and office hours, learn the difficult material, and complete and turn in all their assignments on time.

Teaching, communication, and interactions in this class will follow a high touch approach and the Socratic method. Attendance and participation in class are an integral part of this course.

Students are encouraged to ask questions and actively participate during class and office hours. I highly recommend that you come to office hours regularly with your questions. Students who come to class and office hours receive priority for my time and attention. As I believe that emails are an inferior means of teaching, communication, and interaction for this course, and as the class will instead follow a high touch approach and the Socratic method, email will not be used as a tool for individual teaching, communication, or interaction for this course. Students are discouraged from emailing me during the semester while the class is still ongoing, and should not expect any individual or timely response to any emails that they send to me. This includes all forms of email and email-type messaging, including emails, emails sent via Canvas messaging, emails sent via Zoom, email replies to Canvas messages, and email replies to Zoom messages.

In addition, in fairness to all the students in the class, any office hour that I hold must be open to everyone. During the semester while the class is still ongoing I am therefore unfortunately unable to have any individual appointments or meetings with students in the class. Similarly, teaching and course-related information conveyed by email will be conveyed to everyone via Canvas announcements, the Canvas course website, and/or the Syllabus. If you would like to ask or talk to me about something, please ask or talk to me in person in class or in office hours. Similarly, if you would like individual and/or timely attention, or would like to communicate or interact with me individually, please come talk to me in person in class or in office hours.

One exception to this email moratorium is that students who are requesting me to fill out and sign a form related to this class – such as add petitions, midterm grade reports, or drop petitions – should both (1) let me know in class or in office hours, and (2) email me both their request as well as the form at least 7 days before the form is due.

Another exception to this email moratorium is that after the semester is over and grades have been submitted, email is probably the best way for former students to contact me. Although I am unfortunately unable to respond immediately and individually to each and every email that I receive, I am always absolutely thrilled and delighted to hear from former students and to hear about all the great and wonderful things you are up to, and I encourage former students to keep in touch.

PARTICIPATION

There are 14 lectures in this course. Students are expected to attend all 14 lectures in this course. Attendance and participation in class are an integral part of this course. Critical material and information important for the class, problem sets, and the final project are conveyed during lecture and not via any other medium. As explained below, problem sets are based on the material covered during lecture; the final project is based on material from lectures and problem sets; and recaps of each problem set will take place during lecture after the respective problem set has been graded. There is no textbook for this class, nor any other perfect substitute for the learning, discussions, and interactive activities that take place and the material, knowledge, and information conveyed during class.

Participation in this course will be graded out of 42 points total.

Students in this class will use an iClicker remote. We will not be using the iClicker REEF app.

Students will receive 1 participation point for each iClicker question that they correctly answer during lecture. Students must each use their own iClicker remote, and students must be in class in person when responding to iClicker questions. Students are not permitted to give their iClicker to anyone else to use or respond for them; students are not permitted to share iClicker questions with other students to respond; and students are not permitted to respond to iClicker questions when they are not present in the classroom in class. Any such unauthorized behavior is a violation of the course code of conduct and constitutes academic misconduct.

For any lectures that take place over Zoom, students will receive 1 participation point for each Zoom poll question that they correctly answer during any lectures that take place over Zoom. Students must each use their own Zoom meeting to respond to the Zoom poll, and students must be in the Zoom meeting in person when responding to Zoom poll questions. Students are not permitted to give their Zoom meeting registration or information to anyone else to use or respond for them; students are not permitted to share Zoom poll questions with other students to respond; and students are not permitted to respond to Zoom poll questions when they are not present in the Zoom meeting for that lecture. Any such unauthorized behavior is a violation of the course code of conduct and constitutes academic misconduct.

Students will receive 1 participation point for each class interaction activity in which they participate. There will be class interaction activities during some of the lectures. For any lectures that take place over Zoom, in order to participate in class interaction activities, please have your video on so that your entire face is visible, and please make sure your audio and microphone are working.

There will be at least 3 opportunities to earn either an iClicker question participation point or a class interaction activity participation point in each of the 14 lectures (Lectures 1-14); some lectures may have more than 3 opportunities to earn a participation point. For any lectures that take place over Zoom, there will be at least 3 opportunities to earn either a Zoom poll question participation point or a class interaction activity participation point in each Zoom lecture. Since there will therefore be at least 42 opportunities to earn participation points via iClicker (or Zoom

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poll) questions and class interaction activities during lecture throughout the semester, students who earn all the iClicker question participation points, all the class interaction activity participations points, and all Zoom poll question participations points in all the lectures will receive the full 42 points out of 42 points total for the participation component of the course. For lectures that take place over Zoom, in order to earn participation points, please have your video on so that your entire face is visible, and please make sure your audio and microphone are working. Students are encouraged to continue to earn participation points, even after they have received the maximum number of participation points.

Students will receive 1 participation point for each lecture during which they participate in the class discussion. There will be class discussions during some of the lectures.   For lectures that take place over Zoom, in order to participate in class discussions, please have your video on so that your entire face is visible, and please make sure your audio and microphone are working. To participate in class discussions, please electronically raise your hand via Zoom, and wait to be called on.

Students will receive 1 participation point for each of Professor Lin Lawell's office hours they attend. Students are encouraged to come to office hours regularly with their questions, even when they have already received the maximum participation points.

Students who earn 14 or more class interaction activity participation points will receive 1 extra credit point on their final project grade.

Students who earn 2 or more class discussion participation points will receive 1 extra credit point on their final project grade.

Students who attend 2 or more of Professor Lin Lawell's office hours will receive 1 extra credit point on their final project grade.

Students who earn 54 or more participation points will receive 1 extra credit point on their final project grade. Students who earn 60 or more participation points will receive an additional 1 extra credit point on their final project grade, for a total of 2 extra credit points (when also counting the 1 extra credit point for earning 54 or more participation points) on their final project grade.

Before each lecture, an announcement indicating whether the upcoming lecture will be exclusively in-person or exclusively on Zoom will be posted on the "Announcements" section of the Canvas course web site.

Before each lecture that will be on Zoom, the URL to register for the Zoom meeting for the upcoming lecture will be posted on the "Announcements" section of the Canvas course web site. There will be a separate registration and a different URL for registering for each lecture and a different Zoom meeting (and a different Zoom meeting URL and Zoom meeting ID) for each lecture, so you will need to register separately and again for each lecture, even if you have registered for a previous lecture. Please register using your Cornell email that has your Cornell NetID before "@cornell.edu". Please give yourself at least 1 hour to register for the Zoom meeting in advance of each lecture, so that you are certain to be registered in time to receive the Zoom

meeting information, URL, and Zoom meeting ID for joining the Zoom meeting for that lecture, and so that you can join the Zoom meeting in time for the beginning of lecture on Mondays at 7:30pm Eastern Time.

For the Zoom meetings for both lecture and office hours, please join Zoom on a device that has a camera, a microphone, and audio, so that you can see and hear and can be seen and heard; that has a large enough screen that you can see what is written on the board.

For both in-person and any Zoom lectures, please be prepared to take notes during lecture in the same way you would take notes for an in-person lecture in class (e.g., by writing in your notebook or typing on your computer).

Before each Zoom lecture, be sure to familiarize yourself with Zoom, give yourself enough time to make sure your video and audio works, make sure you have a setup that enables you to see, hear, be seen, be heard, and take notes. Please also familiarize yourself with how to electronically raise your hand in a Zoom meeting. After you join the Zoom meeting, at the bottom of the Zoom window, click on "Reactions"; at the bottom of the menu that pops up there should be a button you can click that enables you to electronically raise your hand in a Zoom meeting.

Lectures are not to be audio recorded or video recorded by anyone except the course instructor.

For lectures that take place in Zoom, in order to attend lecture and participate in class, you must have your video on so that your entire face is visible, and your audio and microphone need to be working. To ask questions during lecture, please electronically raise your hand via Zoom, and wait to be called on.

Students are encouraged to ask questions and actively participate during class and office hours, even when they have already received the maximum participation points, and even when they do not receive additional participation points for doing so.

Participation in this course will be graded out of 42 points total. Each participation point up to the maximum 42 participation points will be equally weighted, each constituting $1/42^{nd}$ of the total participation grade for this course.

PROBLEM SETS

There will be 13 weekly problem sets in this course. They are an integral part of the course. These problem sets are designed to help students understand and engage with the methods, quantitative tools, and concepts introduced in class; and to teach students how to apply the methods, quantitative tools, and concepts to analyze natural resource issues at global and local levels; to introspectively reflect on their own lives and future aspirations; and to draw lessons and implications for leadership, management, and policy

Problem sets will be posted on the Canvas course web site. After each lecture, the problem set based on that lecture and all the lectures preceding it will be posted on the Canvas course web site. For example, Problem Set 1, which will be based on the material presented in Lecture 1, will be posted on the Canvas course web site after Lecture 1. Similarly, Problem Set 2, which will be based on the material presented in Lectures 1-2, will be posted on the Canvas course web site after Lecture 2. As explained below, after Lecture 14 (the final lecture), the final project based on that lecture and all the lectures preceding it (i.e., based on all the Lectures 1-14) will be posted on the Canvas course web site in lieu of a problem set.

Each problem set will be graded out of 100 points total.

Each problem set covers material from all lectures that have taken place before that problem set is due. The material covered on problem sets is cumulative; later problem sets build on previous problem sets. For example, Problem Set 1 covers material from Lecture 1. Problem Set 2 covers material from Lectures 1-2. Problem Set 3 covers material from Lectures 1-3. Problem Set 13 covers material from Lectures 1-13. As explained below, the final project covers all lectures (i.e., Lectures 1-14) and all problem sets (i.e., Problem Sets 1-13).

Problem sets must be submitted (and received) in a zipped file onto the course web site before the beginning of class **by 5:00pm Eastern Time** the day they are due, and the zipped file must include a handwritten and signed honor pledge. No extensions will be granted.

Owing to Spring Break, Problem Set 9 will be due by 5:00pm Eastern Time the Tuesday after Spring Break instead of before the beginning of class by 5:00pm Eastern Time the Monday after Spring Break.

For each problem set, each student must hand write and sign the following honor pledge below on paper in their own handwriting, include a scanned copy of the handwritten and signed honor pledge in their online submission which is due by 5:00pm Eastern Time the day that problem set is due:

> *I affirm that I have respected and upheld the highest principles of honesty, honor, and integrity on Problem Set <#>, and that I have completed and written up Problem Set <#> separately on my own.*

Please upload and submit your problem sets in a zipped file onto the course web site by **5:00pm Eastern Time** the day they are due. The zipped file should be named

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"<Lastname>_<Firstname>_PS<#>.zip", and should include a write-up of the answers in a pdf file entitled "<Lastname>_<Firstname>_PS<#>_answers.pdf", a scanned copy of the handwritten and signed honor pledge, as well as any and all Excel files used for the assignment. The writeup should be in pdf format, and should include all graphs, all calculations, derivations, results, tables, etc. For example, Barbara McClintock's first problem set would include a write-up of the answers in a pdf file entitled McClintock_Barbara_PS1_answers.pdf", a scanned copy of the handwritten and signed honor pledge,s as well as any and all Excel files used for the assignment; and all these files would be submitted in a zipped file with the name "McClintock_Barbara_PS1.zip". Similarly, Mae Jemison's second problem set would include a write-up of the answers in a pdf file entitled "Jemison_Mae_PS2_answers.pdf", a scanned copy of the handwritten and signed honor pledge, as well as all Excel files used for the assignment; and all these files be submitted in a zipped file with the name "Jemison_Mae_PS2.zip".

The online submission for problem sets is through Canvas, in the same "Assignments" section of the Canvas course web site where the problem sets are posted. There will be one item per problem set, and this item includes the problem set itself as well as the portal for submission. For example, the portal for submitting the first problem set online can be accessed by clicking "Problem Set 1" in the "Assignments" section of the Canvas course web site.

Students may submit their problem sets multiple times online if they would like. For each problem set, the last version of that problem set submitted online will be counted as what you have submitted online for that problem set, and will override any previous submissions of that problem set (even if a previous version may have earned you a higher score). The last version of the problem set submitted online must therefore be submitted online by 5:00pm Eastern Time the day it is due – regardless of whether a previous version of that problem set was submitted on time.

If the last version of the problem set submitted online is submitted (and received) online past the 5:00pm Eastern Time deadline the day it is due, minutes and seconds late will be rounded up to the next whole hour and 10 points will be automatically deducted for each hour the problem set is late. For example, if the last version of the problem set is submitted and received online at 5:01pm Eastern Time the day it is due, then 10 points will be deducted from the problem set score. Similarly, if the last version of the problem set is submitted and received online at 6:01pm Eastern Time the day it is due, then 20 points will be deducted from the problem set score. Likewise, if the last version of the problem set is submitted and received online at 7:01pm Eastern Time the day it is due, then 30 points will be deducted from the problem set score. If the last version of the problem set is submitted 2:00am Eastern Time or later the day it is due (i.e., if the last version of the problem set is submitted more than 9 hours after it is due), or if the problem set is never submitted online, then 0 points will be given for the problem set. The deductions for late submissions are made automatically by Canvas, and are based on the clock used by Canvas. Students are encouraged to submit their problem sets well ahead of time, so that any difficulty with the submission, internet congestion, internet connectivity, and/or differences in the clock used by Canvas and their own clock, etc., will not cause their problem set submission to be submitted (and received) online past the 5:00pm Eastern Time deadline and marked and penalized as Late by Canvas. No extensions will be granted.

Students are expected to attend all lectures in this course. Attendance and participation in class are an integral part of this course. Students who are unable to attend a class for any reason are still responsible for submitting their problem set online by 5:00pm Eastern Time the day the respective problem set is due.

Students may consult each other on problem sets, but each student must complete and write up each of his or her problem sets separately on his or her own. Each student's problem set should therefore be unique and different from problem sets or final projects submitted by other students in the class, and also different from problem sets or final projects submitted by students in previous classes or in other classes.

Students who complete and submit their problem sets on time will receive comments and feedback on their submitted problem sets in Canvas along with their problem set score. A recap of each problem set will take place during lecture after the respective problem set has been graded.

Study and reference guides for each problem set will be posted in the "Modules" section of the Canvas course web site after the deadline for the respective problem set has passed. The study and reference guides indicate, for each question in each problem set, which lectures and course materials cover the material, methods, quantitative tools, and concepts for that question; as well as the learning outcomes that question is designed to help achieve. Students are encouraged to come to office hours with any questions you may have, including any questions about problem sets; any questions about the material covered in the lectures and course materials referenced in the study and reference guides; and any questions to help you master the learning outcomes in referenced the study and reference guides.

Students are encouraged to ask questions and actively participate during class and office hours, and to come to office hours with their problem set questions.

Graduate level requirement: Students in AEM 5500 are required to complete and submit all 13 problem sets.

Each problem set will be graded out of 100 points total. The 13 problem sets will be equally weighted, each constituting $1/13^{th}$ of the total problem set grade for this course.

FINAL PROJECT

There will be a final project that is due at the end of the semester. The final project will challenge students to synthesize, apply, and extend what they learn in lecture; and to apply the methods, quantitative tools, and concepts to analyze natural resource issues at global and local levels; to introspectively reflect on their own lives and future aspirations; and to draw lessons and implications for leadership, management, and policy.

The final project covers all lectures (i.e., Lectures 1-14) and all problem sets (i.e., Problem Sets 1-13), and will be posted on the Canvas course web site after Lecture 14.

Graduate level requirement: The final project for AEM 5500 will include 2 components: (1) the final project analysis assignment given to students in AEM 4500 / ECON 3860; and (2) a final project paper and video. Each of the 2 components will be graded out of 100 points total.

The final project must be submitted online by **TBA**, and include a handwritten and signed honor pledge. No extensions will be granted.

Please upload and submit your final project in a zipped file onto the course web site. The zipped file should be named "<Lastname>_<Firstname>_Final_Project.zip", and should include a write-up of the answers in a pdf file entitled "<Lastname>_<Firstname>_Final_Project_answers.pdf", a scanned copy of the handwritten and signed honor pledge, the final project paper in a pdf file entitled "<Lastname>_<Firstname>_Final_Project_paper.pdf", the final project slides in a pdf file entitled "<Lastname>_<Firstname>_Final_Project_slides.pdf", the final project video in an mp4 file entitled "<Lastname>_<Firstname>_Final_Project_video.mp4", as well as all Excel files used for the final project. The writeup should be in pdf format, and should include all graphs, all calculations, derivations, results, tables, etc. For example, Robert Fogel's final project would should include a write-up of the answers in a pdf file entitled "Fogel_Robert_Final_Project_answers.pdf", a scanned copy of the handwritten and signed honor pledge, as well as all Excel files used for the final project; and all these files be submitted in a zipped file with the name "Fogel_Robert_Final_Project.zip".

The online submission for the final project is through Canvas, in the same "Assignments" section of the Canvas course web site where the final project is posted. There will be one item for the final project, and this item includes the final project itself as well as the portal for submission. The portal for submitting the final project online can be accessed by clicking "Final Project" in the "Assignments" section of the Canvas course web site.

Students may submit their final project multiple times online if they would like. The last version of final project submitted online will be counted as what you have submitted online for the final project, and will override any previous submissions of the final project (even if a previous version may have earned you a higher score). The last version of final project submitted online must therefore be submitted online by **TBA**.

On the final project, each student must hand write and sign the following honor pledge:

I affirm that I have respected and upheld the highest principles of honesty, honor, and integrity on this final project, and that I have completed and written up this final project separately on my own.

If the last version of the final project submitted online is submitted (and received) online past the deadline of **TBA**, minutes and seconds late will be rounded up to the next whole hour and 10 points will be automatically deducted for each hour the final project is late. The deductions for late submissions are made automatically by Canvas, and are based on the clock used by Canvas. Students are encouraged to submit their final projects well ahead of time, so that any difficulty with the submission, internet congestion, internet connectivity, and/or differences in the clock used by Canvas and their own clock, etc., will not cause their final project submission to be submitted (and received) online past the deadline of **TBA**, and marked and penalized as Late by Canvas. No extensions will be granted.

Students may consult each other on the final project, but each student must complete and write up his or her final project separately on his or her own. Each student's final project should therefore be unique and different from final projects or problem sets submitted by other students in the class, and also different from final projects or problem sets submitted by students in previous classes or in other classes.

Students are encouraged to ask questions and actively participate during class and office hours, and to come to office hours with their final project questions.

Graduate level requirement: The final project for AEM 5500 will include 2 components: (1) the final project analysis assignment given to students in AEM 4500 / ECON 3860; and (2) a final project paper and video. Each of the 2 components will be graded out of 100 points total. The 2 components will be equally weighted, each constituting ½ of the total final project score for this course.

The total final project score, plus any extra credit points received on the final project grade, will then constitute the final project grade. For example, if a student receives a total final project score of 100 out of 100, and if the student also receives 1 extra credit point on the final project grade from attending 2 or more of Professor Lin Lawell's office hours, then this student will receive a final project grade of 101 out of 100.

GRADING

Participation: 42%
Problem Sets: 52%
Final Project: 6%

	AEM 4500 / ECON 3860	**AEM 5500**
Participation	42%	**42%**
Problem Sets	52% (12 out of 13 problem sets required)	**52%** **(all 13 problem sets required)**
Final Project Analysis	6%	**3%**
Final Project Paper and Video		**3%**

This graduate-level elective course is very challenging, time- and work-intensive, and demanding, but also very rewarding for students who are willing to work hard and put in the time and effort to attend and actively engage in lectures and office hours, learn the difficult material, and complete and turn in all their assignments on time.

Students are encouraged to work hard and put in the time and effort to attend and actively engage in lectures and office hours, learn the difficult material, and complete and turn in all their assignments on time, and to strive for outstanding achievement and mastery of the difficult material in this class.

CLASS SCHEDULE

Date	Assignment Due (5:00pm Eastern Time)	Topic
Mon 1/23		**Lecture 1: Optimal Decision-Making**
Mon 1/30	Problem Set 1 due (5:00pm Eastern Time)	**Lecture 2: Dynamically Optimal Decision-Making Over Time**
Mon 2/6	Problem Set 2 due (5:00pm Eastern Time)	**Lecture 3: Property Rights and Land**
Mon 2/13	Problem Set 3 due (5:00pm Eastern Time)	**Lecture 4: Nonrenewable Resources**
Mon 2/20	Problem Set 4 due (5:00pm Eastern Time)	**Lecture 5: Dynamically Optimal Nonrenewable Resource Extraction**
< February Break>	*< February Break>*	*< February Break>*

Mon 3/6	Problem Set 5 due (5:00pm Eastern Time)	**Lecture 6: Monopoly Production of Nonrenewable Resources**
Mon 3/13	Problem Set 6 due (5:00pm Eastern Time)	**Lecture 7: Forests**
Mon 3/20	Problem Set 7 due (5:00pm Eastern Time)	**Lecture 8: Forest Management and Policy**
Mon 3/27	Problem Set 8 due (5:00pm Eastern Time)	**Lecture 9: Fisheries**
< Spring Break>	*< Spring Break>*	*< Spring Break>*
Mon 4/10		**Lecture 10: Water Economics**
Tue 4/11	Problem Set 9 due (5:00pm Eastern Time)	
Mon 4/17	Problem Set 10 due (5:00pm Eastern Time)	**Lecture 11: Water and Groundwater Policy**

Mon 4/24	Problem Set 11 due (5:00pm Eastern Time)	**Lecture 12: Resource Markets, Demand, Supply, and Scarcity**
Mon 5/1	Problem Set 12 due (5:00pm Eastern Time)	**Lecture 13: Sustainability**
Mon 5/8	Problem Set 13 due (5:00pm Eastern Time)	**Lecture 14: Lessons for Leadership, Management, and Policy**
TBA	Final Project, Paper, and Video due (TBA)	*Final Project, Paper, and Video due online by TBA*

Updated January 19, 2023