Energy and Environmental Economics

Instructor Information

Dr. Fidel Gonzalez Professor Department of Economics and Intl. Business Sam Houston State University

Email: fxg001@shsu.edu Web Page: http://www.shsu.edu/~fxg001 Phone: (936) 294-4796 Office: SHB 237J Office Hours: T and TR 9.45am – 11.00 am or by appointment. Send me an email if you cannot make it to my office hours to set an appointment. Walk-ins are welcome.

Course Information

Meeting Place: SHB 204 TTR 2.00 – 3.20 PM Course Number: ECON 3352-01 Semester: Fall 2017 Credit Hours: 3

Course Content

This class will study the economics of public policy toward natural resources, the environment and the energy sector. The objective of the class is to provide you with the tools and techniques to analyze environmental policy. You will develop economic economist and start thinking about the environmental and natural resources like an economist.

The class is divided in two sections. The first one covers the economic theory on the environment: public goods, externalities, property rights, market failure and social cost-benefit analysis. In this part, we will cover the different instruments and policies used by the government.

In the second section of the class we will use the tools learned in the previous section to analyze real environmental problems like ozone layer depletion, acid rain, climates change and others.

Textbook

There is no required textbook for the class. I will post notes for each class lecture after the class. Moreover, I have placed on reserve several copies of the following book if you want additional reading. This book used to be the required textbook for the class so it is helpful but it does not justify the expense. You can see in the outline of topics the corresponding textbook chapter for each topic. Moreover, it is perfectly fine to get older editions of the book if you want to buy it. The acceptable editions of the book are 8th, 9th and 10th. Any of those editions works fine for this class.

Tom Tietenberg and Lyne Lewis. "Environmental and Natural Resource Economics". Pearson, Addison Wesley.

Assignments and Grading

Grading will consist of exams, homework and in-class quizzes.

I. Exams

1) There will be three partial exams and one final exam.

2) Each partial test has a weight of 20% on your final grade for a total of 60%.

4) The final exam is comprehensive and mandatory and has a weight of 15% in your final grade.

5) To help you out, the final exam grade substitutes the lowest grade of your partial exams. For example, imagine that your grades in the partial exams are: 90, 85 and 65. Then you take the final and obtain a grade of 75. In this case, the grade of 65 in your lowest partial exam is substituted for a grade of 75 and that 75 has a weight of 35% in your final grade (15% from the final exam and 20% from the partial exam). If the final exam grade is no better than any of your partial exam grades your lowest exam grade will not be substituted, you will keep your old higher grade and the final exam grade will count only for 15% of your final class grade.

6) I will post a practice test before each partial exam and you can get extra credit points in the actual exam for doing the practice exam (see below for details).

7) See the class calendar for each exam date.

II. Homework

1) There will be six homework sets.

2) The homework set will be similar to the midterms.

3) The main purpose of the homework is to better prepare you for the partial exams and to familiarize you with the material.

4) The homework will be posted online and you MUST input your answers online (do not email me the answers or turn them in by hand).

5) You will have about a week to work on the homework. In the class calendar you will see the date each homework is posted and the due date. You can save your work on and come back later to finish the homework. However, make sure that you must submit your answers by the due date and time.

6) THE HOMEWORK IS DUE AT MIDNIGHT OF THE RESPECTIVE DUE DATE.

7) Because the homework is online, you will have two attempts for each homework and I will only count your highest grade of those two attempts. However, you must submit the homework before the due date and time. Right after submitting your first attempt you can see your grade, the questions, your answer and the correct answer for each question in the homework. You can use this information to study and take the homework again. When you take it again a new set of questions will show up and you can use your previous attempt to study and answer the second attempt. After you submit your second attempt you will be able to see your grade, the questions, your answer and the correct answer for each question in that attempt as well. You can save your homework and come back later in both attempts so you do NOT have to do it in one sitting. Remember, <u>I will only count your highest grade out of those two attempts as your grade for that homework</u>. For example, imagine that you take Homework 1 and you get 70 in the first attempt and 85 in the second attempt, then your grade in Homework 1 is 85.

8) Homework will be graded from 0 to 100. If you do not input your answers before the due date and time you get a zero.

9) When calculating your final grade, I drop your lowest homework grade and then calculate your homework average.

10) The homework average (without the lowest grade) has a weight of 20% in your final grade.

III. Quizzes

1) There will be a total of six in-class quizzes in the semester.

2) The main purpose of the quizzes is to make sure that you are following the material so they have a small weight on your final grade.

3) Each quiz consists of two or three easy questions about the most important topics of the previous topic covered (see the class calendar). That is, the quiz covers the topics covered the previous two classes. Do not stress about the quizzes too much, if you study the material you should be able to get a good quiz grade.

4) Quizzes will take place in the first five minutes of some classes. See the class calendar for the specific days quizzes will take place. Make sure you come to class early those days. If you come late you may miss the quiz and get a zero on that quiz.

5) Quizzes will be graded from 0 to 100. If you do not take the quiz you get zero.

6) When calculating your final grade, I drop your lowest quiz grade and then calculate your quiz average.

7) The quiz average (without the lowest grade) has a weight of 5% in your final grade.

SUMMARY OF GRADING ITEMS AND WEIGHTS

Exam 1	20%
Exam 2	20%
Exam 3	20%
Final Exam	15%
Homework Average (w/out lowest grade).	20%
Quiz Average (w/out lowest grade)	5%
Total	100%

Answers to online assignments

Every online assignment (Homework and Practice Exam) is different for each student. Because of this, after you have submitted your assignment you will be able to see your score, your answer and the correct answer for every question in your assignment. This means that you DO NOT HAVE to wait until the due date to see the answers. You can access this information any time after you have submitted your assignment by going to "My Grades" and clicking on the grade for that assignment.

Late Assignment and Make-up Policy

I understand that life happens during the semester but I also want to be fair to everyone else. So, I am trying to balance things out. If you cannot take an exam on time because of a medical or family emergency, some kind of University athletic activity or other justifiable reason then let me know and I will allow you to take it earlier or later without any penalty (within a reasonable timeframe). However, be prepared to show me some documentation to substantiate your claim. This for when things get real, so I went out and party because the Texans won does not count, unless you get hurt celebrating, then it counts. In any case, talk to me and we can figure something out.

Extra Credit Practice Exams

You can also get extra points in the partial exams by doing the corresponding Partial Exam online on Blackboard. The practice exam is posted before each partial exam and it is similar (although not the same) to the actual test. I know that if you work on the practice exam you will do better in the actual test, so I am doing this to incentivize you to work on the practice exam.

In the class calendar you can see when each practice exam will be posted and when it closes.

This is how it works (read it carefully, it's not the usual blah, blah):

1) You can take the Practice Exam as many times as you want but I will only consider the highest grade you get in all of your attempts to give you extra points.

2) If your highest grade out of all your attempts is between:

60 to 69 you get 1 extra point in the actual test,

70 to 79 you get 2 extra points in the actual test,

80 to 89 you get 3 extra points in the actual test,

90 to 99 you get 4 extra points in the actual test,

100 you get 5 extra points in the actual test.

3) Once you have finished each attempt of the Practice Exam you can check your answers and the correct answers by going to "My Grades" and clicking on your grade (the same way you would check it for the other assignments).

4) Every time you take the Practice Exam a new set of questions will be drawn randomly from a pool of questions. Therefore, you will see slightly different questions every time you take it.

5) You have up to 75 minutes to finish each attempt. Each attempt must be finished in one sitting. That means you cannot pause or stop the clock. To be fair to everyone, once the 75 minutes are up the practice exam will be automatically submitted if you have not submitted it yet.

6) Practice Exam will remain open until right before the actual exam. For example, the Practice Exam 1 will close on September 26^{th} at 2.00 pm.

7) The Practice Exam is under the "Extra Credit Practice Exams" unit.

8) Please notice that these are extra credit points, if you do not want to do it, it is ok and it will not lower your Exam grade. This is just to help you.

Please remember, that there is no penalty for taking the Practice Exam multiple times. In fact, I want to encourage you to take it as many times as possible. The more practice you get the better prepared you will be for the actual test.

Example: Alex takes the Practice Exam 2 four times and he gets the following scores: 50, 78, 90, 60. This means that Alex will get 4 extra points added to this Exam 2 grade because the highest grade in all of his attempts is a 90. Then, Alex takes the actual Exam 2 and gets a grade of 86. In this case, the Total Exam 2 Grade for Alex is 86 + 4 = 90 for a letter grade of "A".

Attendance

I will take attendance starting on the first day of class by university regulations. However, attendance for extra points will start on the second class. In order for your presence to count as attendance you have to stay for the whole class time.

Attendance is important but not required. I believe that you will learn more if you come to class:

If you do not miss any classes, you will receive a bonus of 2 points out 100 of in your final grade. If you only miss one or two classes you will receive one bonus point.

Final Numerical and Letter Grade.

The final numerical grade is calculated as follows:

(Homework Average without the lowest grade) x 0.20				
+				
(Quiz Average without the lowest grade) x 0.05				
+				
(Exam 1) x 0.20				
+				
(Exam 2) x 0.20				
+				
(Exam 3) x 0.20				
+				
(Final Exam) x 0.15				
[if final exam grade is higher that lowest partial exam grade then lowest partial exam				
grade is dropped, final exam replaces that grade and it is multiplied by 0.35]				
+				
Extra Points for Attendance				
Final Numerical Grade				

Once I obtain the final numerical I will assign a letter grade using the following table. Please note that there is no curve in the final numerical grade.

Final Numerical Grade	Final Letter Grade
90 to 100	А
80 to 89	В
70 to 79	С
60 to 69	D
Less than 60	F

Grade Calculator

I understand that grades are very important. I will post in Blackboard a link to a grade calculator that I have developed for the class. In this calculator you can input the grades of each homework, quiz and midterm and it will compute your final numerical and letter grade. Clearly, you do not know what grades you have in some items because you have not done in those cases just input an expected grade (that is a grade you think you can make). This is a tool to help you figure out how you are doing in the class and the find out what grades you need to get to obtain certain letter grade.

Important Dates

Exam 1Tuesday September 26thExam 2Thursday October 26thExam 3Thursday November 30thFinal Exam Tuesday December 5th(3.30 to 5.00 pm)

Email and Phone

During the semester I will be sending emails to the students in the class. These emails go from reminders about assignments to clarifications to the lecture notes or if I add additional material. The emails are sent to your SHSU account, make sure that you have a working SHSU email.

Academic dishonesty, students with disabilities, visitors to the classroom and religious holiday policies.

I will follow the University's policies for academic dishonesty, students with disabilities, visitors to classroom and religious holidays posted in the following link: <u>http://www.shsu.edu/syllabus</u>

Classroom Policies.

During lectures the only rule is that you do not behave in a manner that disrupts or distracts the learning process. You can use your cell phone, tablet or laptop in a discreet and non-disruptive manner to me and to the other students. Use common sense. The penalties for not following this simple rule are up to my discretion.

During exams cell phones, tablets, smart watches or any communication device are NOT allowed. We must follow Academic Policy Statement 100728 that states the use of these devices during a test is considered de facto evidence of cheating and could results in a charge of academic dishonesty. Moreover, this policy also states that even the visible presence of such devices during exams can be considered as cheating. I have no choice in this matter, so if you phone or communication device is visible or you use it during a test then it is considered as cheating. The penalties for cheating are up to my discretion but they usually result in an "F" in the class.

The link to Academic Policy Statement 100728 is below:

 $\underline{https://www.shsu.edu/dotAsset/6d35c9c9-e3e9-4695-a1a1-11951b88bc63.pdf}$

Economics Department's Webpage

Whenever you have some free time go to the Department of Economics website where you can find updated information about our department, resources for students, information about scholarships, study abroad programs and much more.

Economics Department webpage: <u>http://www.shsu.edu/academics/economics-and-international-business/</u>

Mandatory Assignments						
Assignment	Weight in Final Grade	Date	Purpose			
Exam 1	20%	September 26th	Test your knowledge of the material			
Exam 2	20%	October 26th	Test your knowledge of the material			
Exam 3	20%	November 30th	Test your knowledge of the material			
Final Exam*	15%	December 5 th (3.30 to 5.00 pm)	Test your knowledge of the whole semester. Final is comprehensive.			
Homework Average (without lowest grade)	20%	Homework 1: Sept. 5th to Sept. 12th Homework 2: Sept. 14th to Sept. 21st Homework 3: Oct. 5th to Oct. 12th Homework 4: Oct. 17th to Oct. 24th Homework 5: Nov. 7th to Nov. 14th Homework 6: Nov. 16th to Nov. 28th	Prepare you for the exams.			
Quizzes	5%	Quiz 1: Sept. 5th Quiz 2: Sept. 19th Quiz 3: Oct. 10th Quiz 4: Oct. 19th Quiz 5: Nov. 2nd Quiz 6: Nov. 14th	Assure that you are following with the class material			
Total	100%					
	*If your Final Exam grade is higher than your lowest exam grade then your final exam grade will be used as your lowest grade for a total weight of 35% and your lowest partial exam grade will be dropped.					
	Optional Extra Credit Assignments					
Attendance Extra Points	If you do not miss any classes, you will receive a bonus of 2 points in your final grade. If you only miss one or two classes you will receive one bonus point. More than two absences you do not get any extra credit.					
Extra Credit Practice Exam	If your highest grade in all of your submissions of the Practice Exam is between 60 to 69 you get 1 extra point in the actual test; 70 to 79 you get 2 extra points in the actual test, 80 to 89 you get 3 extra points; 90 to 99 you get 4 extra points; 100 you get 5 extra points.					

SUMMARY OF MANDATORY AND EXTRA CREDIT ASSIGNMENTS

CLASS CALENDAR

Thursday August 24th First Day of Class	Tuesday August 29th	Thursday August 31st	Tuesday September 5th In-class Quiz 1 Homework 1 Assigned	Thursday September 7th	Tuesday September 12th Homework 1 Due at Midnight
Thursday September 14th	Tuesday September 19th	Thursday September 21st	Tuesday September 26th	Thursday September28th	Tuesday October 3rd
Homework 2 Assigned	Practice Exam 1 Posted on Blackboard	Midnight	Practice Exam 1 closes at 2.00 pm		
Thursday October 5th	Tuesday October 10th	Thursday October 12th	Tuesday October 17th	Thursday October 19th	Tuesday October 24th
Homework 3 Assigned	In-class Quiz 3	Homework 3 Due at midnight	Homework 4 Assigned	Practice Exam 2 Posted on Blackboard In-class Quiz 4	Homework 4 Due at midnight
Thursday October 26th	Tuesday October 31st	Thursday November 2nd	Tuesday November 7th	Thursday November 9th	Tuesday November 14th
EXAM 2		In-class Quiz 5	Homework 5 Assigned		In-class Quiz 6
at 2.00 pm					midnight
Thursday November 16th	Tuesday November 21st	Tuesday November 28th	Thursday November 30 th	FINAL EXAM Tuesday December 5 th : 3.30– 5.00 PM Practice Final Exam Posted on Blackboard on December 1 st (closes at 3.30pm pm on December 5 th)	
Homework 6 Assigned		Homework 6 Due at midnight	EXAM 3		
Practice Exam 3 Posted on Blackboard			Practice Exam 3 closes at 2.00 pm		

APPROXIMATE OUTLINE OF TOPICS BY LECTURE (this is an outline of what would be covered, please beware that topics may change depending on the class interest and how fast we can covered the material)

I. ECONOMICS AND THE ENVIRONMENT

Lecture 1

- . Introduction
- . Economics and the Environment
- . Positive and Normative Economics
- . Cost-Benefit Analysis

Lecture 2

- . Marginal Benefits and Costs
- Present Value Calculations
- . Total Benefits and Costs
- . ▶Net Benefits
- . First Equimarginal Principle

II. ENVIRONMENTAL DEMAND

Lecture 3

- Present value of net benefits
- . Example and applications of present value calculations
- . Environmental demand
- . Marginal willingness to pay for environmental goods
- . Use, non-use and option value

Lecture 4

- ▶Non-use values
- Existence, altruistic and bequest values
- . States and revealed preferences
- . Contingent valuation

Lecture 5

- . Contingent valuation
- Example of contingent valuation
- . Problems with contingent valuation
- Revealed preferences.
- . Travel cost method, defensive expenditures and hedonic prices

Lecture 6

- . Defensive expenditures
- . Example of defensive expenditures
- . Hedonic prices

Textbook Chapter: 3

Textbook Chapter: 2

- . Elasticity
- . Examples of hedonic prices

Lecture 7

- . Risk and hedonic valuation
- . Expected damages
- . Valuation of a statistical life

Lecture 8

- Problems with the value of a statistical life
- . Final remarks on hedonic valuation

III. COMMON GOODS AND EXTERNALITIES

Lecture 9

- . Externalities
- . Excludability and rivalry
- Types of goods
- . Private, common, artificially scarce and public goods

Lecture 10

- . Tragedy of the commons
- . Solution to common goods
- . Negative externalities
- . Pecuniary and technological externalities

Lecture 11

- . Social and private benefits
- . Social and private costs
- . Private marginal benefits and costs
- . Social marginal benefits and costs
- . Graphing externalities

Lecture 12

- . Consumer net benefit
- . Firms' profits
- . •Victims
- . Total welfare
- . Social optimal level of the externality
- . Private optimal level of the externality
- . Welfare lost from the externality
- . Solutions to externalities
- . Taxes on externalities

Lecture 13

- . Permits on externalities
- . Free and sold permits
- . Permits and welfare
- . Scarcity rents

Textbook Chapter: 4

Lecture 14

- . Final remarks on permits
- ▸Coase solution to externalities
- . Pros and cons of Coase solutions.
- Uses of each instrument to fix externalities

IV. TOP ISSUES IN ENVIRONMENTAL ECONOMICS

Textbook Chapter: 17

Lecture 15

- . Chlorofluorocarbons
- . Ozone layer depletion
- . Public policies toward chlorofluorocarbons

Lecture 16

- Final remarks on chlorofluorocarbons
- . Sulphur dioxide
- . →Coal
- . Acid rain
- . Local pollutants
- Public policies toward acid rain
- . Lead pollution and crime

Lecture 17

- . Lead pollution and crime last remarks
- . Introduction to global warming
- . Carbon dioxide
- . Greenhouse effect

Lecture 18

- . Carbon cycle
- . Natural and anthropogenic emissions of carbon
- . Natural and anthropogenic sinks of carbon

Lecture 19

• Demand and supply of energy in the U.S.

Lecture 20

- . Global warming evidence
- Costs of global warming

Lecture 21

- ▸Kyoto Protocol
- Problems with the Kyoto Protocol

Lecture 22

- . GDP, population and carbon emissions
- . •Kaya identity
- Additions to Kaya

► Kaya in deviation form

Lecture 23

.

- . Global warming and uncertainty
- Dr. Wilcoxen's uncertainty exercise

V. OTHER TOPICS IN ENVIRONMENTAL ECONOMICS

Lecture 24

- . Double dividend hypothesis
- Partial and general equilibrium analysis

Lecture 25

- . Environment and development
- . Normal and inferior goods
- . Environmental Kuznets curve