SYLLABUS – SPRING 2020

ARE 220: Introductory Environmental & Resource Economics

Class Times: Tuesday and Thursday 09:30 – 10:45am

Class Venue: CPASS Building 102

Instructor	**:**	Douglas Mugabe
Office	**:**	Room 4437, AG-SCI BLDG, 4-th FLOOR
Phone	**:**	(304) 293-5541
E-Mail	**:**	domugabe@mix.wvu.edu
Office Hours:		Tuesday 2:30–3:30pm & Thursday 2:30–3:30pm or by appointment.

Required Text

You are encouraged to obtain copies of both Callan et al., (2013) and Harris et al., (2018). There are inexpensive eBook copies available. Materials from Tietenberg et al., (2018) will be made available on eCampus if needed.

(1) Callan, S. J., & Thomas, J. M. (2013). Environmental economics and management: Theory, policy, and applications. 6th Edition. Cengage Learning Inc.

(2) Harris, Jonathan and Brian Roach. (2018). *Environmental and Natural Resource Economics, A Contemporary Approach*. 4th Edition, Routledge, New York.

Other References

(3) Tom Tietenberg and Lynne Lewis. (2018). Environmental & Natural Resource Economics (11th Edition). Routledge.

Course Objectives

The objective of ARE 220 is to provide students with an overview of the theory and application of environmental and natural resource economics. Students will gain an ability to recognize the components of environmental and natural resource problems. Students will be introduced to and use some basic economic tools for assessing environmental and natural resource issues. Real-world environmental issues such as climate change, pollution trading programs, and water quality will be presented and discussed. Students are expected to actively participate in class discussions. In addition, students are encouraged to visit my office for consultations.

This course satisfies General Education Foundations (GEF) F4 (**Society and Connections**) or General Education Curriculum (GEC) objective G04 (**Issues of Contemporary Society:** *Apply knowledge, methods, and principles of inquiry to contemporary problems, ideas, and/or values*). Consistent with the GEF and GEC objectives, students should be able, after leaving the class, to apply methods of critical thought to understanding and analysis of issues to how environmental issues and global interdependence influence society's economic decisions and approaches to environmental problems. Course materials will address the context of environmental issues and the interaction of humans with the environment. Students will acquire and use quantitative and scientific knowledge and technology to assess and analyze environmental issues.

Expected Learning Outcomes

Upon successful completion of the course, it is expected that each student will be able:

(1) To explain simple economic models and the assumptions required to assess model results;
(2) To use and interpret the economic models that assess contemporary environmental and natural resource economics issues;
(3) To solve simple mathematical and analytical problems related to environmental and natural resource economics; and
(4) To critically analyze environmental and natural resource issues using the appropriate tools.

Course Methods

Course material will be presented through lectures, in-class exercises and class discussions. Readings from the required textbook and supplemental readings, including recent publications will be used to support and reinforce lectures. The progress of student understanding will be measured through homework assignments, group assignments and presentations, class participation and exams.

General Course Policies and Expectations

(1) **Late/Absence Policy:** Students should plan to attend every class. There are no make-up opportunities for homework assignments or tests without **written verification** of unavoidable circumstances that is presented to me **prior to the exam or homework due date**. **NOTE:** Consistent with WVU guidelines, students absent from regularly scheduled exams because of authorized University activities will have the opportunity to take them at an alternate time.
(2) **Communication and appointments:** Please visit me during office hours if questions remain after reading the relevant chapter and attending the related lecture. The best time to ask questions is during the class! That said, emails will be responded to in a timely manner, in most cases within a few hours. However, if emails are sent outside of normal business hours, I may not respond until the next day. Compose e-mails in a professional manner that reflects your communication skills that you will use during your successful careers. It is helpful to reference the course (ARE 220) in the subject line or somewhere within the text and to provide your full name. Students should also check the syllabus prior to contacting me with questions related to exam dates, make-up policies, or other course policy related questions. Students should check their school email regularly as email will be my primary form of mass communication with the class.
(3) **Preparedness and class participation:** Reading the material before coming to class is beneficial to understanding the material. Participation in class, where appropriate, is both expected and welcome. Asking questions in class if you are confused is beneficial to both the instructor and other students.
(4) **Class disruptions:** Engaging in private conversations, reading materials unrelated to the class, leaving the classroom unnecessarily, or any other activity that creates negative externalities for others in the class should be avoided. This includes use of electronic devices in the classroom in a manner that is not consistent with the educational process.
(5) **Cell phone, laptop computer, and other electronic devices:** As this is the year 2020, taking notes on a laptop is acceptable. However, if it becomes apparent that laptop usage

has become a distraction, this courtesy will be revoked. Cell phones are not allowed during class, they distract the instructor and your colleagues.

Academic Integrity:
The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, instructors will enforce rigorous standards of academic integrity in all aspects and assignments of their courses. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the West Virginia University Academic Standards Policy (http://catalog.wvu.edu/undergraduate/coursecreditstermsclassification). Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see your instructor before the assignment is due to discuss the matter.

Inclusivity:
The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in your classes, please advise your instructors and make appropriate arrangements with the Office of Accessibility Services. (https://accessibilityservices.wvu.edu/) More information is available at the Division of Diversity, Equity, and Inclusion (https://diversity.wvu.edu/) as well.

Sale of Course Material:
All course materials, including lectures, class notes, quizzes, exams, handouts, presentations, and other course materials provided to students for their courses are protected intellectual property. As such, the unauthorized purchase or sale of these materials may result in disciplinary sanctions under the Student Conduct Code. (https://studentconduct.wvu.edu/policies-and-procedures)

Potential Change:
It may be necessary to modify this course during the semester. I reserve the right to revise the syllabus and alter this course at my discretion. I will announce any changes in class and/or post changes on eCampus.

Grading

Grading Summary

Activity	Points
Homework assignments	20%
Group assignment and presentation	20%
Class participation and attendance	5%
Midterm exam	25%
Final exam	30%
Total	**100%**

Final grades will be assigned according to the following scale:

Grade	Points
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

1. **Homework (20%):** Six bi-weekly homework assignments will be administered, and your best **four** grades will be applied to your final grade. Homework is mainly **due on Fridays**, usually two weeks after it is assigned. ***No late assignments will be accepted***.

2. **Group assignment and presentation (20%):** Each student will be randomly assigned to a group. Each group will develop and present a 15-minute PowerPoint presentation (10% of final grade) about an environmental or natural resource issue that is interesting to them. We will have all the presentations in week 16. Each group is also required to submit a 2-5 page writeup (10% of final grade) document to be evaluated. The submission of the writeup is due after all group presentations. Additional information about this assignment will be provided on eCampus.

3. **Class Participation (5%):** Participation in class, where appropriate, is both expected and welcome. In particular, asking questions in class is beneficial to both the instructor and other students. This is not a large section class so absenteeism will not go unnoticed. Class participation will be tracked during the semester to determine this portion of the grade.

4. **Exams (55% total):** There will be a **Midterm exam (25%)** and a **Final exam (30%)** scheduled for February 27 and May 7 respectively. These exams will consist of short answer, multiple choice, and essay questions reflecting the first 6 and last 7 weeks of materials covered in class respectively. A review session will be held prior to each exam. Please bring a calculator for the exam.

5. **Extra Credit:** There is no extra credit built into the course. Also, please note that I do not "bump up" grades at the end of the semester.

Technical Support
For technical assistance, Information Technology Services offers support from 6:30 a.m. to midnight every day and responds to voicemail and email left overnight at the beginning of each business day.

Please contact Information Technology Services at http://it.wvu.edu/.
Phone: (304) 293-4444
Toll Free: 1(877) 327-9260
Email: ITSHelp@mail.wvu.edu

ADVERSE WEATHER COMMITMENT

In the event of inclement or threatening weather, everyone should use his or her best judgment regarding travel to and from campus. Safety should be the main concern. If you cannot get to class because of adverse weather conditions, you should contact the instructor as soon as possible. Similarly, if the instructor is unable to reach the class location, you will be notified of any cancellation or change as soon as possible (two to three hours before class starts), using (MIX/eCampus) to prevent you from embarking on any unnecessary travel. If you cannot get to class because of weather conditions, allowances will be made relative to required attendance policies, as well as any scheduled tests, or other assessments.

Course Outline

Below is a tentative course outline. Dates/topics may be adjusted depending upon the progress of the class. Announcements related to any changes will be communicated in class and via email. Other lecture materials will be posted on eCampus for you to download or to print out.

Dates	TENTATIVE SCHEDULE & Readings
Week 1	Class Introduction and Syllabus Review
13-17 Jan	Overview of Environmental and Resource Economics: *Harris & Roach: chapter 1, 3-7*
	Environmental and natural resource issues: *Callan and Thomas: Chapter 1, pages 7-11*
	HOMEWORK 1 HANDOUT: 17 JANUARY
	The role of Economics in Environmental Management
Week 2	Circular Flow Model: *Callan and Thomas: Chapter 1, pages 2-7; Harris and Roach: Chapter 1,*
20-24 Jan	*7-14*
	Review of Economic Theory
	Market Demand: *Callan and Thomas: Chapter 2, pages 26-34; Harris and Roach: Chapter 3, pages 68-70*
	ASSIGNING GROUP MEMBERS & TOPICS: 23 JANUARY
	Market Supply: *Callan and Thomas: Chapter 2, pages 33-38; Harris and Roach: Chapter 3, pages*
Week 3	*70-72*
27-31 Jan	**No Class on January 30**
	HOMEWORK 2 HANDOUT: 28 JANUARY
	HOMEWORK 1 DUE: 31 JANUARY
	Market Equilibrium Conditions *Achieving the largest benefits: Callan and Thomas: Chapter 2,*
Week 4	*pages 38-44; Harris and Roach: Chapter 3, pages 72-74*
3-7 Feb	Welfare Measures: Consumer and Producer Surplus: *Callan and Thomas: Chapter 2, pages 44-49; Harris and Roach: Chapter 3, pages 75-85*
	Market failures: Do markets always provide the right answer?
	Environmental quality: Public good: *Callan and Thomas: Chapter 3, pages 53-61; Harris and Roach: Chapter 4, pages 100-104*

Week 5 **10-14 Feb**	Environmental Externalities: *Chapter 3, pages 6-69; Harris & Roach: Chapter 3, pages 43-52* Property Rights and Coase Theorem*: Callan and Thomas: Chapter 3, pages 69-74; Harris and Roach: Chapter 3, pages 54-64* Common Property Resources: *Callan and Thomas: Chapter 3, pages 74-75; Harris and Roach: Chapter 4, pages 88-100* Fishery Management: *Harris and Roach: Chapter 4, pages 88-101* **HOMEWORK 2 DUE: 14 FEBRUARY**
Week 6 **17-21 Feb**	**Assessing Environmental Benefits** Environmental benefits: Overview: *Callan and Thomas: Chapter 7, pages 146-153; Harris and Roach: Chapter 6, pages 126-130* Approaches to measuring environmental benefits: *Callan and Thomas: Chapter 7, pages 153-166; Harris and Roach: Chapter 6, pages 130-143*
Week 7: **24-28 Feb**	Revision and Preparation for Midterm Exam **MID TERM EXAM: 27 FEBRUARY** **HOMEWORK 3 HANDED OUT: 28 FEBRUARY**
Week 8 **2-6 Mar**	**Project Implementation:** Assessing costs for project implementation: *Callan and Thomas: Chapter 8, pages 170-177; Harris and Roach: Chapter 7, pages 151-168* Benefit Cost Analysis: *Callan and Thomas: Chapter 9, pages 186-195; Harris and Roach: Chapter 7, pages 151-168* **HOMEWORK 4 HANDED OUT: 3 MARCH** **HOMEWORK 3 DUE: 6 MARCH**
Week 9 **9-13 Mar**	**Solutions to environmental problems:** Environmental objectives: *Callan and Thomas: Chapter 1, pages 12-17; Harris and Roach: Chapter 8 pages 177-202* Command and Control: *Callan and Thomas: Chapter 4, pages 80-95; Harris and Roach: Chapter 8 pages 177-202* Market Based Approaches: *Callan and Thomas: Chapter 5, pages 89-121; Harris and Roach: Chapter 8 pages 177-202*

Week 10 **16-20 Mar**	**Spring Break (14-22 March) No Classes**
Week 11 **23-27 Mar**	**Economics of Poverty, Economic Development & Natural-Resource Use:** Overview of the relation between poverty, environment and natural-resource use: *Handout; You can also refer to; Dellink, Rob and Ruijs Arjan (Eds). (2008). Economics of Poverty, Environmental and Natural Resource Use.* Causes of the poverty–resource degradation: *Handout* **HOMEWORK 5 HANDED OUT: 24 MARCH** **HOMEWORK 4 DUE: 28 MARCH**
Week 12 **30-3 Apr**	**Management of Renewable Resources:** Fishery management: Harris and Roach: *Chapter 4, pages 88-101; Chapter 18 pages 492-507* Forests and Economics of timber harvesting: *Harris and Roach: Chapter 4, pages 101-103 & Chapter 19 pages 513-527*
Week 13: **6-10 Apr**	**Energy production and trends:** Energy: Basic Economic Concepts: *Harris and Roach: Chapter 11 pages 269-270* Energy sources: *Harris and Roach: Chapter 11 pages 270-274* Energy trends and projections: *Harris and Roach: Chapter 11 pages 274-278* Fossil fuels and Renewables: *Harris and Roach: Chapter 11 pages 278-285* Energy: Transitions to alternative energy sources: *Harris & Roach: Chap 11 pages 286-299* **HOMEWORK 6 HANDED OUT: 7 APRIL** **HOMEWORK 5 DUE: 11 APRIL**
Week 14 **13-17 Apr**	**Climate Change:** Causes of climate change: *Callan and Thomas: chapter 13 pages 299-304; Harris and Roach: Chapter 12 pages 307-330* Climate change mitigation and adaptation: *Callan and Thomas: Chapter 13 pages 204-322; Harris and Roach: chapter 12 pages 336-368*
Week 15 **20-24 Apr**	**Water Economics and Policy:** Water allocation (Supply and Demand): *Callan and Thomas: Chapter 14 pages 330-396; Harris and Roach: Chapter 20 pages 534-538*

	Water sources and consumption: *Callan and Thomas: Chapter 14 pages 331-333; Harris and Roach: Chapter 20 pages 538-552* Water pricing and the water footprint: *Callan and Thomas: Chapter 15 pages 352-372; Harris and Roach: Chapter 20 pages 538-552* Water rights, water markets and privatization: *Callan and Thomas: Chapter 15 pages 352-356; Harris and Roach: Chapter 20 pages 552-559* **HOMEWORK 6 DUE: 25 APRIL**
	Revision and Preparation for the Final Exam
Week 16	**GROUP PRESENTATIONS: 28 & 30 April**
27-1 May	**GROUP ASSIGNMENTS DUE: 1 MAY**
	LAST DAY OF CLASSES: 1 MAY
Week 17	**EXAM WEEK**
4-8 May	**FINAL EXAM: SCHEDULED ON MAY 7, AT 5:00-7:00p.m.**