Econ 432 - Applied Environmental Economics

O'Malley School of Business
Manhattan University
Spring 2025

Instructor:	Dr. Jimena González	**Time:**	MWR 11:00 – 11:50 am
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Office:	DLS 413		

1 Course Description

A study of the applications of economic theory and econometric methods to analyze environmental problems, policies, and improvements. The course focuses on environmental data analysis including summary statistics, visualizations and econometric regressions. Topics include behavioral economics and experiments focused on common resources, public goods, and nudges, as well as revealed and stated preference methods and applications to value improvements to the environment. (**Prerequisites: Econ 203 and Buan 227**)

If any of the questions below are of interest, this course is for you.

- How do economists use R to analyze environmental data?
- How do economists conduct environmental economics research?
- How can environmental economists use econometrics to answer research questions?

2 Learning Goals and Objectives

By the end of this course, students will be able to

1. read and understand environmental economics journal articles.
2. write R code to summarize and visualize environmental data
3. write R code to perform econometric analysis focused on environmental applications, including linear regressions, regressions for binary outcome variables, panel regressions, and discrete choice models.
4. write and knit RMarkdown files to report code, output, and analysis.
5. learn about behavioral economics applications focused on public goods, common resources, and green nudges.
6. learn about recreation demand, hedonic pricing, and stated preference econometric applications in R.

3 Office Hours

My office hours are **in-person** in my office (DLS 413) on **Mondays and Thursdays** from **12:20 - 1:20 pm**. You have two options to set an appointment. To schedule an office hours appointment, please follow the instructions below. After the appointment is set up, you will find the appointment in your Google Calendar. Hence, I expect every student to use Google Calendar (See Google Calendar Video Tutorial).

- **Option 1 (try this first)**: Go to Dr. González' Google Calendar Appointments that have 20-minute office hours time slots. If you decide to stop by my office hours at the last minute (i.e. 5 minutes before they start or while they are happening, check the same link to verify that there is an opening.
- **Option 2**: If the appointment slots don't work, please send me a calendar invitation. Follow these instructions. Through this method, you have to wait until I accept the calendar invitation. Depending on my schedule, these appointments may be virtual.

4 Course Materials

I use different open-source textbooks and journal articles throughout the course (these resources are free). Students must pay careful attention as we will not follow a single textbook.

Required Readings:

1. **(HAGS:)** Hank, Arnold, Gerber, & Schmelzer. "Introduction to Econometrics with R." (2024-02-13) (Open source textbook that is a work in progress)
    - You can create an account and your own private group to annotate or highlight throughout the text.
    - You may also download the book as a Pdf. However, there are interactive pieces within the online platform that are not part of the pdf.
2. **(O)**: Oswald et al. "Introduction to Econometrics with R." (2020-11-03) (open source textbook that is a work in progress)
    - You can access this textbook on a web browser or download as an ePUB or PDF.
3. **(H-K)**: Huntington-Klein, Nick. "The Effect" (2023-02-13)
4. **(H)**: Hoyos et al. "Environmental Valuation with Discrete Choice Experiments" (2021)
5. **(FA)**: Fogarty & Aizaki "Non-Market Valuation with R" (2021-03-29)
6. **(A)**: Alexander, R. "Telling Stories with Data" (2023-07-27)
7. Assigned journal articles and R package documentation that will be announced throughout the course

Recommended Podcasts: I strongly encourage you to read about current events and try to connect and apply the course material to them. Important sources include:

- The New York Times (As an MU student, you can subscribe for free)
- Environmental Economics Blog: https://www.env-econ.net/
- NPR Planet Money Podcast
- NPR The Indicator from Planet Money Podcast
- Freakonomics Podcast
- RFF's Resources Radio Podcast

5 Technology

- **R**: Students are required to use R.
- **R Studio**: Students are required to use R Studio throughout the course.
- **Moodle**: Students are responsible for checking Moodle since information about assignments, readings and class information in general will be posted there.
- **MU Email**: Every student must have a Manhattan email account. Course announcements will occasionally be sent to your Manhattan email. Therefore, students must check their email accounts regularly.
- **Slack**: Students need to join a Slack group through an email invitation.
- **Slack App**:
  - Students need to use Slack, which is a communication tool used in the business world. While you can access Slack via a web browser, I highly recommend to download the free app to your computers and/or phones. See video tutorial. Links to download Slack App:
    - Windows
    - Mac
    - Andriod
    - iPhone
  - The main purpose of the app is to communicate. You will be able to post message for the entire class or send messages to individual students or me. I also send announcement and reminders in Slack.
  - Hence, getting notifications from the app is very important (you are responsible for checking the app → **turn on the notifications**).
  - You will receive an invitation to join Slack. Please join Slack this before the first day of classes.
- **ITS Personal PC & Technology Recommendations**: These can be found on the ITS website, here.
- **Google Drive File Stream**: Download Google Drive to your laptop as this will allow you to back up any files (not only Google Suite files) to your computer. See instructions.
- **Microsoft Office**: as a MC student, you may install Microsoft Office (Word, Excel, etc) on up to 5 personal devices. See instructions.

6 Course Structure

Course Format and Expectations: The course follows a flipped classroom format: students watch videos and do readings outside of class. Class time is used to work on activities. It is expected that you will watch the assigned online videos and do the readings prior to class on the days that these are due. The class activities that will take place on these days will require that you have a sufficient understanding of the topics covered in these videos and readings.

Each topic is covered following the same steps:

1. **Pre-class Preparation**: Before class, students read the assigned textbook sections, journal article, listen to the podcast, or watch videos.

2. **Pre-class Textbook Reading Quizzes**: Online reading quizzes based on textbook readings are taken individually prior to class through Moodle. Answers to the questions won't be revealed until the quiz closes. No make-ups are allowed on quizzes. I drop your lowest individual quiz score at the end of the course.

3. **Pre-class Podcast/Journal Article Quizzes**: From time to time, students are asked to read peer-reviewed journal articles/working papers or listen to a research podcast. Before class, students take an online reading quiz on Moodle. Answers to the questions won't be revealed until the quiz closes. No make-ups are allowed on quizzes. I drop your lowest individual quiz score at the end of the course. There will never be both textbook and journal article/podcast quizzes due on the same date.

4. **Participation**: Students will be assessed for their participation during:

   - Discussions based on the research podcast
   - Guest speaker's presentations. Students are expected to pay attention and to ask questions after the presentations. This grade is based on both items. Students are expected to ask questions after each presentation that demonstrate their preparation by reading the article and paying careful attention during the presentation. *Failure to attend a presentation without a valid excuse results in a **2-percentage point** reduction in this grade. A student who is not paying attention (including usage of any technology) or who is disrespectful during a presentation will be penalized with a **1-percentage point** reduction for this grade.*

   This grade also includes professional behavior in class, such as arriving on time and not disrupting the classroom, including coming in and out of it.

5. **In-Class Activities (Labs)**: Students are given in-class activities (labs), which provide hands-on R and RMarkdown programming experience using environmental data. Most class times are allocated to these activities. Students submit a knitted RMarkdown file at the end of each activity. These activities are started during class but may be finished at home depending on the progress made. There are no makeup in-class activities.

6. **Midterm Project**: Each student receives unique data and is asked to apply econometric techniques to analyze the data and answer questions. Detailed instructions about the assignment are provided later.

7. **Research Project**: After the midterm, students start developing a research project. Students identify environmental data and a research question for their projects that must be approved by me. After the approval, students inspect, clean, and summarize the data through summary statistics and visual representations. Lastly, students propose a methodology to analyze the data, run regression models, and write a research report. Detailed instructions about the assignment will be provided. For the final project, students will be asked to give very short presentations during the final exam period.

8. **Meme Challenge**: During the final exam period, there will be a competition. The goal of each student is to create a meme that showcases a concept learned in the course. Memes will be submitted by the end of the last week of classes. The winners of the competition will receive extra points for the final project.

9. **Attendance Policy and Expectations**: In accordance with college policy, I will keep careful attendance records and file a report to the Dean's office when a student has four unexcused absences. Extended absences (excused) should be reported to your Academic Advisor who will inform all of your professors. According to Manhattan College's attendance policy, all students are expected to attend all classes. More important than simply attending, however, is being present for the active process of learning that occurs in class. You should expect and be prepared to be called on, and to participate in discussions and activities. Due to the nature of the class, attending EVERY class is extremely important. Missing multiple classes will severely harm your performance and ability to pass the course.

10. **Valid Excuses**: If a medical emergency, or a serious illness, or a family emergency causes you to miss class, you must inform me of the emergency before class with an explanation. To facilitate the communication, use this Google Form which keeps records for absences and failure to submit assignments due to valid excuses. Students must submit this form the date of the absence or of the failure to submit the assignment (unless the absence prevents the student from doing so). Late forms are not accepted unless there is a valid reason. The form also allows students to submit documentation.

7 Grading

Grade Breakdown:

Activity	Weight
Textbook Reading Quizzes	10%
Journal Article/Podcast Quizzes	8%
Participation	4%
In-Class Activities (ICAs)	45%
Midterm Project	10%
Final Project	20%
Final Project Presentation	2%
Meme Challenge	1%

Grade Guideline:

Range	Grade
93.00% - 100.00%	A
90.00% - 92.99%	A-
87.00% - 89.99%	B+
83.00% - 86.99%	B
80.00% - 82.99%	B-
77.00% - 79.99%	C+
73.00% - 76.99%	C
70.00% - 72.99%	C-
67.00% - 69.99%	D+
60.00% - 66.99%	D
$< 60.00\%$	F

I reserve the right to curve.

Economics majors and minors need a minimum of a C grade to have this course count for credit toward his/her major or minor

If you disagree with any grading, you must submit an appeal. To appeal, you must submit to me the following information in-writing (an email is fine): which question(s) or problems are you appealing and why. If you can make a logical, well-reasoned, well-written argument for your case, you will be granted the points upon appeal. **Appeals must be made within 1 week after the graded assignment has been returned to you**.

8 Course Outline[2]

For each topic, econometric model, or R package, the course focuses on applications to environmental data and analysis.

1. **Coding Basics**
   - 1.1. File organization and Google Drive File Streaming
   - 1.2. Introduction to R and R Studio
   - 1.3. Introduction to R Markdown
   - 1.4. Programming Basics
2. **Working with Data**
   - 2.1. Cleaning data
   - 2.2. Tidyverse Package
   - 2.3. Summary Statistics
   - 2.4. Graphs (ggplot2 package)
3. **Linear Regressions**
   - 3.1. Linear regression with one regressor
   - 3.2. Linear regression with multiple regressors
   - 3.3. Revealed Preference Models (e.g. Hedonic regression)
   - 3.4. Goodness of Fit
   - 3.5. Potential issues with linear regressions (e.g. biases)
4. **Research Design & Experiments**
   - 4.1. Developing research questions
   - 4.2. Experiments (public goods, common-pool resources, nudges)
   - 4.3. Quasi-experiments
5. **Other Regressions Models**
   - 5.1. Binary outcome regressions
   - 5.2. Panel Data models
6. **Environmental Valuation Methods - Discrete Choice Models**
   - 6.1. Stated preference methods

2. This is a tentative schedule for the course and might change during the course. I will inform you about any changes in the outline for the course or the schedule.

Other Important Dates:

- **January 17th**: Late Registration & Add/Drop ends
- **January 20th**: Martin Luther King Jr. Day - No classes
- **January 21st (Tuesday)**: Monday schedule
- **February 26th (Wednesday)**: Jasper Wellness Day
- **March 6th**: Midterm grades are due
- **March 17th - 21st**: Spring Break - No classes
- **April 11th**: Last day to withdraw
- **April 17th - 21st**: Easter Break - No classes
- **May 6th (Tuesday)**: Final Exam Period for Econ 432 from 8:30 to 10:30 a.m.

9 Class Policies

In order to provide an excellent learning environment to everyone, there are some basic rules that must be followed:

1. Students are not allowed to have cell phones on, off or on vibrating during class hours.
2. Students are expected to attend and participate during class. The student must come to class on time and leave the classroom after the class is over. Students who arrive late or leave early disrupt other students and affect the flow of the class. Please be considerate of your peers. If you need to leave early for a valid reason, please let me know before class. If you arrive late, please quietly enter the classroom.
3. Students are expected to come prepared to class.
4. Students are encouraged to ask questions during class.
5. I understand the advantages of using technology as a learning tool. However, technology can also be misused during class. Inappropriate usage of technology (such as web-surfing, texting, emailing, getting calls, checking Snapchat, TikTok, IG, twitter, etc, or any unauthorized activities) through laptops, smartwatches, tablets, cell phones, or any other mobile devices during class will not be tolerated. **A student who violates this policy will be penalized with a 1% grade point reduction for each violation.**
6. Students who miss a class are responsible for all the material covered during the class and are responsible for making the necessary arrangements to submit assignments.
7. Students should not engage in conversations or distracting activities during the lecture.
8. Students are expected to listen and respect different viewpoints. There is zero tolerance for disrespectful behavior.

9. **AI Chats**: In this course, you are encouraged to use AI chat tools (e.g., ChatGPT, Claude, etc.) to assist with your learning and coding assignments. These tools can be valuable resources **troubleshooting and refining your work, NOT to write code or answers to questions**. However, their use comes with the following guidelines to ensure academic integrity and meaningful learning:
    - **Record your interactions:** You must keep a detailed record of your interactions with the AI. This record should include: the question or prompt you submitted, the AI's response, and any modifications that you made based on the AI's suggestions. Save this record in a document (e.g., a text or markdown file). I may ask you to submit it at any time.
    - **Understanding the Assistance:** It is your responsibility to understand any code or concepts the AI helps you generate. You may be asked to explain your code or reasoning during class discussions, exams, or project reviews. Over-reliance on AI without understanding the output will impact your grade if you cannot demonstrate comprehension.
    - **Attribution:** Clearly attribute any assistance received from AI tools in your code comments or assignment submission. For example, you may add: "# Function inspired by ChatGPT response on Jan 10, 2025".
    - **Ethical Use:** Do not use AI to bypass the learning process or to complete assessments intended to evaluate your individual understanding (e.g., coding, quizzes or the write-up of your analysis in the ICAs, midterm project, or final project). For example,you are not allowed to copy and paste a question prompt into an AI Chat. You should always try the coding assignment before asking the chat to help troubleshoot or refine the code. Moreover, you are not allowed to use the chat output for open-ended or interpretation questions. Misrepresenting AI-generated work as entirely your own without proper attribution is considered academic dishonesty and will be treated as a violation of the university's academic integrity policy.
    - **Best Practices:** Use AI as a supplement, not a substitute. Engage with course materials, ask questions, and collaborate with peers to deepen your understanding. Treat AI suggestions critically—validate the output, check for errors, and adapt the solutions to suit the assignment requirements.

10 How to succeed in this course

- Read the assignments carefully before class as the readings will help students be prepared for the reading quizzes and to program in R.
- Attend every class.
- To master a new language, you must practice!
- If you are having trouble, please ask for help. Talk to me after class, send me a Slack message or an email or come to my office hours. I really want you to learn and master the material!

11 Academic Integrity

As a Manhattan College student, you are a part of a community of scholars and learners guided by the basic values of civility, safety and the discourse of ideas. Students are to be committed to the principles of honesty, trustworthiness, fairness, and respect for the human dignity of all persons. Students must abide by the Manhattan College Honor Code and uphold the highest standards of academic integrity. Cheating, plagiarism, fabrication, academic misconduct, attempting or assisting with an academic integrity violation will not be tolerated. As the course instructor, if I become aware of a potential academic integrity violation, I will follow the rules and procedures outlined in the policy on Academic Integrity. It is your responsibility to be familiar with the College's policy on Academic Integrity.

12 Copyright of Course Materials and Resources

Lectures delivered by faculty in class and online are protected by federal copyright law as original work. Misappropriation of intellectual property is the act of intentionally taking the intellectual property of faculty or others, and/or the sale or distribution of class notes, tests, assignments or class projects for profit, either directly or through a third party, without the express consent or permission of the faculty member or lecturer, or without documentation to demonstrate the need for such accommodations. Such property includes, but is not limited to class notes, tests, assignments, class projects or other academically related work. All academic work undertaken by a student must be completed independently unless instructed otherwise by a faculty member or other responsible authority.

Electronic video, image capture, and/or audio recording are not permitted during class, whether conducted in person or online without permission of the instructor. Students with specific electronic recording accommodations authorized by the Student Specialized Center do not require instructor permission; however, the instructor must be notified of any such accommodation prior to recording. Any distribution of such recordings is prohibited.

All course materials developed by the faculty for this course and not otherwise copyrighted, such as the textbook, case studies, published articles, are proprietary to the faculty. Any dissemination or sharing of these materials on websites, social media accounts, via email, in private chats, etc., is not allowed without explicit permission of the faculty. Such posts can be considered as a violation of Academic Integrity and will be dealt with accordingly. Related to that, any use of materials you may find, posted online or otherwise made available to you by previous students will be considered as plagiarism, which is also a violation of Academic Integrity.

13 Disabilities

Under the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973, all students, with or without disabilities, are entitled to equal access to the programs and activities of Manhattan College. If you believe that you have a disabling condition that may interfere with your ability to participate in the activities, coursework, or assessment of the object of this course, you may be entitled to accommodations. Please schedule and appointment to speak with someone at the Specialized Resource Center in Miguel Hall, Room 300.

*****Potential Changes: All details provided in this syllabus are subject to change at my discretion. All changes will be announced in class. If you have missed a lecture, please email me for any announcements.**