Econ 432 - Applied Environmental Economics

O'Malley School of Business
Manhattan University
Spring 2025

Instructor:	Dr. Jimena González	**Time:**	MR 12:00 – 1:15 pm
Email:	jimena.gonzalez@manhattan.edu	**Location:**	DLS 309
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 **3:00 - 4:00 pm**. If you prefer to meet virtually, please let me know when you make the appointment. 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 Outlook Calendar. Hence, I expect every student to use Outlook Calendar.

- **Option 1 (try this first)**: Go to Dr. González' Calendar Appointments that have 20-minute 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.
- **Teams**: We use Microsoft Teams channel to communicate.
  - You will be able to post message for the entire class or send messages to individual students or me. I also send announcements and reminders.
  - 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 the Team's channel.
- **ITS Personal PC & Technology Recommendations**: These can be found on the ITS website, here.
- **One Drive**: Download One Drive to your laptop, as this will allow you to back up any 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. **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.

5. **Midterm Project**: Each student receives unique data and is asked to apply econometric techniques to analyze the data and answer questions. Detailed instructions will be provided. In addition to submitting a written report, students must complete a brief individual oral component. This will take the form of a short meeting with the instructor, during which students will be asked to explain selected elements of their analysis, such as a portion of their code, a model specification, or an interpretation of results.

6. **Final Project**: After the midterm, students will work on a final project that will include collecting and cleaning data. Students will collect, clean, and summarize the data through summary statistics and visual representations. Then, students will apply econometric techniques to analyze the data, run regression models, and write a research report. Detailed instructions will be provided. Detailed instructions will be provided. In addition to submitting a written report, students must complete a brief individual oral component during the final exam period. This will take the form of a short meeting with the instructor, during which students will be asked to explain selected elements of their analysis, such as a portion of their code, a model specification, or an interpretation of results.

7. **Participation**: Active participation and professional behavior are essential to creating a respectful and productive learning environment. Your participation grade reflects both your contributions to class activities and your conduct in the classroom.
   In this course, professionalism includes arriving on time, being prepared, engaging thoughtfully in discussions, listening respectfully to classmates, and using technology appropriately. Behaviors that disrupt the class—such as lateness, misuse of devices, wearing headphones, side conversations, or leaving the classroom unnecessarily—will negatively affect your participation grade (see Class Policies for details).
   Professional behavior is part of your grade in this course. Repeated issues may also result in a meeting

with me to discuss further steps.
In addition, 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.*

8. **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.

9. **Valid Excuses**:If a medical emergency, a serious illness, or a family emergency causes you to miss class, you must inform me of the emergency before class with an explanation. You shouldn't include any medical or family details. For quizzes, labs, and the midterm/final project, you will need to provide documentation. For example, you may ask a doctor or nurse to write a note excusing you (without details about the medical condition). Be aware that the Health Services does not provide medical notes. To facilitate communication, use this Form, which keeps records of absences and failure to submit assignments due to valid excuses. Students must submit this form on 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	5%
Journal Article/Podcast Quizzes	5%
Participation	6%
In-Class Activities (ICAs) / Labs	45%
Midterm Project	15%
Final Project	25%

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 16th**: Late Registration & Add/Drop ends
- **January 19th**: MLK Day - No classes
- **March 5th**: Midterm grades are due
- **Mar 16th - 20th**: Spring Break - No classes
- **April 2nd - 6th**: Easter Break - No classes
- **April 7th (Tuesday)**: Monday schedule
- **April 24th**: Last day to withdraw
- **May 4th (Monday)**: Final Exam Period for Econ 432 from 8:30 to 10:30 am.

9 Class Policies

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

1. **Attendance and Punctuality:** Students are expected to attend and participate in every class session. Arriving late or leaving early disrupts both classmates and the flow of the lesson. Students who arrive late will lose participation points and may also lose time on in-class assessments. Students who leave early without prior approval will lose participation points.
2. **Remaining in Class:** Students are expected to remain in class for the full session. Leaving should occur only in cases of emergency (e.g., bathroom or family emergency). Exiting and re-entering during class without explanation will result in participation point deductions. Students who must leave should speak with me after class.
3. **Headphones and Earbuds:** Headphones and earbuds may not be worn during class. Violations will result in a deduction of participation points.
4. **Preparedness:** Students are expected to come to class prepared, having completed assigned readings and ready to engage in discussion and activities. Coming unprepared will negatively affect your participation grade.
5. **Engagement:** Students are encouraged to ask questions and participate actively. Choosing not to engage (e.g., being distracted or unresponsive during activities) may lower participation points.
6. **Technology Use:** While technology can be a helpful learning tool, misuse is distracting to both you and others.
   - Students are not allowed to have cell phones during class hours unless the instructor asks to take them out. A student who is caught using a cell phone will get a **10% deduction** from the participation grade for each violation.
   - Inappropriate use of technology (e.g., web browsing, texting, social media, unrelated apps, or any unauthorized activity) through laptops, tablets, smartwatches, or phones will not be tolerated. **Each violation will result in a 5% deduction from your participation grade.**
7. **AI Tools:** Artificial intelligence (AI) tools such as ChatGPT, Gemini, and Copilot can be valuable resources for learning, but their use in this course must support—not replace—your own critical thinking and analysis. The following guidelines clarify when and how AI tools may be used across different assignments and activities.

- **Permitted Uses**
  - **Podcasts/Media/Articles**: You are expected to listen/watch/read the podcasts/videos/articles assigned to you. In addition, you may use AI to generate study notes or summaries for personal use, but reflections and discussion responses should be your own. In other words, AI is not allowed to replace your completion of the assignment.
  - **Reading the textbook**: You may use AI tools to help you understand concepts from the textbook. For example, you may ask an AI chat to further explain a concept or provide examples. Thus, AI tools can be used to review concepts or seek clarification, but this should supplement—not replace—your own learning.
  - **Labs**: AI tools can be used to **troubleshoot and refine your work, NOT to write code or answers to questions**. Specifically, you may ask AI to help you troubleshoot your code (e.g., understand an error message) or to explain code lines. You could also ask the chat to provide a sample code with a generic dataset. However, you are NOT allowed to copy and paste prompts or to ask an AI tool to generate/write the code. Any help provided by AI must be understood, documented, and cited. For each Lab, a student is expected to submit an AI statement and the AI chat transcript if AI was used.
  - **Best Practices**:
    - Critical Assessment: Critically evaluate AI output. AI can make mistakes or present incomplete information. For example, AI could make up a source or hallucinate information from a source. Students are responsible for checking the quality of the AI output. Any made-up information included in any assignment will be considered a violation of the AI policy.
    - Documentation: 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. In fact, ask AI to highlight these changes. Save your AI chat transcript, as it is required as part of the submission of any assignment that allows AI tool assistance. Failure to save and provide such chat will result in zero for the assignment.
    - **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 for any Lab as part of the assessment of that activity. 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.
    - **Takeaway:** 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.

- **Prohibited Uses**:
  - Students are **not allowed** to use AI tools or chatbots during quizzes, midterm project, and final project. Violations will result in a zero on the assignment and will be reported as an academic integrity violation.
  - Students are not allowed to copy and paste a question or activity prompt from any graded assignment on AI Chats (This includes quizzes, labs, and projects).
  - Due to the copyrights on my materials, students are not allowed to upload any assignments to AI chats/tools.
- **IMPORTANT: Academic Integrity**: Misusage of AI and violations to the above rules will result in a zero on the assignment and will be reported as an academic integrity violation.
- **Bottom Line:** AI can be a useful supplement to your learning, but it cannot substitute for your own reasoning and writing. Misuse of AI will be treated as a violation of the university's academic integrity policies.

8. **Responsibility for Missed Class:** Students who miss class are responsible for all material covered and for making arrangements to submit assignments on time. Missed participation cannot be made up.

9. **Respectful Conduct:** Side conversations, disruptions, or dismissive behavior toward classmates will not be tolerated. Disrespectful behavior will result in participation point deductions, and repeated issues may result in further action under the university's conduct policies.

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

Manhattan University has devoted itself to fostering a climate of academic trust and integrity, so that our students master their disciplines through their own hard work and manifest their respect for their own work and the work of others through openness and honesty. Our students accept the Academic Code of Honor and pledge that they will not cheat, lie or steal or tolerate others who do. Academic integrity is at the heart of the Manhattan University learning experience.

Academic integrity means that every member of the academic community accepts the responsibility to be honest, truthful, ethical and accountable for all intellectual efforts, for all access to and presentation of data, facts, information and opinions, and for all access to and use of data or other files (printed, oral, audio, video or digital) related in any way to students, faculty, staff or administration. In addition, every member of the Manhattan University community must understand what can constitute violations of academic integrity, the consequences in terms of penalties, and by what process penalties are imposed.

The university policy on academic integrity will be strictly enforced in this class. A full statement of the policy, including definitions of academic integrity violations, levels of violations, and sanctions, can be found in the Student Handbook.

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 Title IX Statement

In accordance with Title IX of the Education Amendments of 1972 that prohibits discrimination on the basis of sex in educational settings that receive federal funds, Manhattan University is committed to providing an environment not impaired by sex and gender-based misconduct. For purposes of Title IX reporting, I am considered a "mandated reporter" at Manhattan University. That means I must share information related to situations involving sex discrimination and sexual harassment, including sexual assault, sexual harassment, domestic violence, dating violence, stalking, and/or retaliation with the Title IX Coordinator. Information for resources, policies, and how to file a formal report can be found on the Title IX/Sexual Harassment webpage of the University website.

14 Student Resources and Support

14.1 Student Academic Support Services — Center for Academic Success

The Center for Academic Success (CAS) is committed to providing student-centered and student-led programs and initiatives designed to enhance learning and promote success and persistence for all Manhattan University students. Students work collaboratively with qualified peers and professionals to develop knowledge, skills, and strategies needed to thrive in the classroom and beyond. The CAS has three locations: the Learning Commons in Thomas Hall 3.11, the Leo Learning Center in Leo

117/118, and Lee Learning Commons 6th Floor.

Services include online and in-person tutoring and writing center appointments, special topics workshops, Supplemental Instruction, STEM and reading/writing professional Learning Specialist support, and English language support. All services are free of charge and available to all Manhattan University students. Appointments are preferred but walk-ins are welcome when available. To make an appointment, students can log into their Jasper Connect account or visit the CAS in Thomas Hall, 3.10. Students can also contact success@manhattan.eduwith any questions.

14.2 Self-Care

Your academic success in this course and throughout your university career depends heavily on your personal health and well-being. Stress is a common part of the university experience, and it often can be compounded by unexpected life changes outside the classroom. The Manhattan University community strongly encourages you to take care of yourself throughout the term, before the demands of midterms and finals reach their peak. Please know there are a number of other support services on campus that stand ready to assist you. I strongly encourage you to contact them when needed (refer to the list below for offices and their contact information). If you or someone you know is in emotional distress, call or text the 988 Suicide & Crisis Lifeline for free, confidential support 24/7.

14.3 Counseling and Psychological Services

The Counseling and Psychological Services office is committed to supporting our students' mental health, emotional health, and well-being. The Counseling Center provides in-person, individual, and group counseling to all full-time undergraduate students. There is no charge for this service.

Our office is located in Miguel Hall, Room 501, and services are available Monday through Friday from 9 am - 4:30 pm. We also have a walk-in hour Monday through Thursday from 2:00 pm to 3:00 pm. Students can schedule an appointment:

- In person: Our office is located in Miguel Hall, Room 501 (access through northern stairwell)
- By phone: (718) 862-7394
- By email: Julie Egan directly at jegan01@manhattan.edu

In the case of a mental health emergency when the Counseling Center is closed: please contact Public Safety at 718-862-7333; they will provide assistance and contact the counseling staff.

14.4 Students with Disabilities in Need of Accommodation

If you have a documented disability (or disabilities) that require(s) special accommodation(s), please contact the Specialized Resource Center via email at src@manhattan.edu. Use of services is voluntary, strictly confidential, and free of charge. Once you have provided documentation to the SRC, it will be reviewed to determine the appropriateness of accommodations and you will receive a completed form to present to each of your professors.

14.5 Technology Support

Contact the help desk to request assistance with a campus technology issue. Your request will be entered into the ticketing system so that it can be tracked and routed to the appropriate person or division.

- Call: 718-862-7973
- Email: its@manhattan.edu

For a complete list of all Manhattan University Information Technology Services visit the ITS webpage.

14.6 Library Section

The O'Malley Library offers resources and services to support your research in this and all your classes. Librarians are available in person, by email, by chat, and by text to assist with finding appropriate information for all your projects. Subject Research Guides are available to identify the most important resources for each major out of the thousands of books, articles, videos, and other resources available to you. For more information or assistance with research assignments select from the links below or drop by the Information Desk in the O'Malley Library

- The O'Malley Library
- Ask Us
- Subject Research Guides

*****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.**