

ECON 432 - APPLIED ENVIRONMENTAL ECONOMICS

O'Malley School of Business
Manhattan College
Spring 2023

Instructor: Dr. Jimena González	Time: MR 12:00 – 1:15 pm
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Office: DLS 422	

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 econometrics be used to inform environmental policy?

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 422). (Note: During the initial remote portion of the semester, I will conduct my office hours via **Zoom**). You have two options to set an appointment. I actively use Google Calendar. I highly recommend every student to actively use Google Calendar (See [Google Calendar Video](#)). To schedule an office hours appointment, please follow the instructions below. After the appointment is set up, you will find the appointment within your Google Calendar. Hence, I expect every student to use Google Calendar.

- **Option 1 (try this first):** Go to [Dr. González' Google Calendar Appointments](#) that have 20-minute time slots.
- **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.

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.](#)" (2020-09-15) (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](#)" (2021)
4. **(A):** Alexander, R. "[Telling Stories with Data](#)" (2021-01-18)
5. **(H):** Hoyos et al. "[Environmental Valuation with Discrete Choice Experiments](#)" (2021)
6. Assigned journal articles and R package documentations that will be announced throughout the course

Recommended Readings:

1. **(C):** Cunningham, S. "[Causal Inference: The Mixtape](#)" (2021-01-26)

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 MC 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.
- **MC 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 online lectures and use class time to work on activities. It is expected that you will watch the assigned online videos 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. The assigned chapters are required reading. I will expect that you have read them prior to class and that you participate based on these 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, and watch a video lecture.
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 the 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. **Podcast Activities:** Research podcast will be assigned prior to class. During class, an activity will be completed based on the podcast.
5. **Guest Speaker's Presentation Participation and Behavior:** During 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 by 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.*
6. **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.
7. **Midterm Projects:** Each student receives unique data and is asked to apply econometric techniques to analyze the data and to answer questions. Detailed instructions about the assignment are provided later.
8. **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.

9. **News Challenge:** During the last class period (before finals), there will be a competition. The goal of each student is to find the most misleading statistical analysis in a news article that makes misleading claims due to one of the following: 1) selection bias 2) omitted variable bias, or 3) confusion of correlation as causation. Each student is assessed on the usage of course materials to critical assess the news article. In addition to the assessment, a rank based on the quality of analysis and level of mislead is determined and the top 3 students get bonus points for the final course grade. Details about this activity are provided closer to the end of the course. However, you should be watching out for misleading news articles.
10. **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.
11. **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	8%
Journal Article/Podcast Quizzes	12%
Podcast Activities	5%
Guest Speaker's Presentation Participation and Behavior	4%
In-Class Activities (ICAs)	30%
Midterm Project	15%
Final Project	20%
Final Project Presentation	4%
News Challenge	2%

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 Outline²

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. Hedonic regression
- 3.4. Goodness of Fit
- 3.5. Potential issues with linear regressions (e.g. biases)

4. Research Design & Experiments

- 4.1. Using R to do research developing research questions
- 4.2. Experiments (public goods, common-pool resources, nudges)
- 4.3. Quasi-experiments
- 4.4. Panel Data Models (if time allows)

5. Other Regressions Models

- 5.1. Logistic Regression
- 5.2. Probit Regression
- 5.3. Linear Probability Model
- 5.4. Panel Data models

6. Environmental Valuation Methods - Discrete Choice Models

- 6.1. Stated preference methods
- 6.2. Multinomial logit
- 6.3. Mixed logit
- 6.4. Conditional logit
- 6.5. Welfare measures

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 24th**: Late Registration & Add/Drop ends
- **March 9th**: Midterm grades are due
- **March 13th - 17th**: Spring Break - No Classes
- **April 6th - 10th**: Easter Break - No Classes
- **April 12th (Wednesday)**: Monday schedule
- **April 18th**: Last day to withdraw
- **May 8th (Monday)**: **Final Exam for Econ 432 from 8:30 until 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. Students are not permitted to have cell phones out, on, or on vibrate during class hours.
2. Students are expected to attend and participate during class. Student must come to class on time and leave classroom after the class is over. Students arriving late or leaving early disrupt other students affecting the flow of the class. Please be considerate with your peers. If you must leave early for a valid reason, please speak to me prior to class. If you arrive late, please enter the classroom in a quiet manner.
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 Facebook, Snap Chat, IG, twitter, etc or any unauthorized activities) through laptops, computers at the lab, 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 any distractive activities during the lecture.
8. Students are expected to listen and to respect different viewpoints. There is zero tolerance for disrespectful behavior.

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 an 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.**