EC 224
Econometric Analysis
TTh 2-3:15pm, CAS 227

Instructor:	Plinio Dias Bicalho	**TA**: TBD
E-mail:	pliniob@bu.edu	TBD
Office Location:	B10 (Econ dpt)	B21 (Econ dpt)
Office Hours:	Tue 3:15-pm (sign up here)	TBD

Course Summary The course can be roughly divided into 3 parts. The first part is more analytical and proof-oriented. We'll go over the foundations of regression analysis and its fundamental theorems. The second part is more practical. We'll go over different tools related to least squares regression and how it can help us investigate causal relationships. Finally, if time permits, we'll move towards natural experiments and more sophisticated tools for investigating causality.

Course Description: This course aims to familiarize students with basic empirical strategies which are frequently used in econometrics. This course covers (tentatively) linear regression with multiple regressors, bootstrapping, nonlinear regression, regression with limited dependent variables, instrumental variable regression, interaction term effects in regression, panel regression, difference-in-difference designs, and regression discontinuity designs. R will be our tool to apply what we learned from theory to economic data. After taking this course, students are expected to be able to run regression analysis by using R and understand the relevant econometric theory.

Prerequisite(s): Familiarity with linear algebra (i.e. matrix multiplication, transpose of a matrix, inverse matrix, etc) and introductory statistics (i.e. properties of covariance, normal distribution, etc) is assumed.

Text(s): Lecture notes should be the primary source that you consult. For further references, read James Stock and Mark Watson's "Introduction to Econometrics (4th edition)" and Angrist and Pischke's "Mostly Harmless Econometrics (Any edition)."

Grade Distribution:

Your grade will be the maximum of the following options:

Option 1		**Option 2**	
Problem Sets	10%	Problem Sets	10%
Midterm 1	25%	Best Midterm	25%
Midterm 2	25%	Final Exam	65%
Final Exam	40%		

Any extra credit opportunities will be announced in class and made available to all students equally and will be awarded at my discretion.

Academic Conduct By the beginning of the semester, students should carefully read and fully understand the CAS Academic Conduct Code:

https://www.bu.edu/academics/cas/policies/academic-conduct/

Any suspected academic misconduct will be reported to the Dean's Office.

Software: Students may purchase Stata/BE. The 6-month version costs $48. You may purchase it here: https://www.stata.com/order/new/edu/profplus/student-pricing/.

I highly recommend students also download R and RStudio. Both can be freely downloaded here https://posit.co/download/rstudio-desktop/.

Exam Regrade Policy: Regrade requests must now go through a formal and rigorous process due to several semesters of students misusing my casual approach to regrading. In the past semesters, I have personally struggled with regrades due to students (I) manually altering exams to ask for regrades (II) asking for regrades in every single question on the exam (III) pressuring me over the email and/or office hours to change their grades (IV) asking repeatedly "why their answer was wrong" after skipping the discussion session design to go over exam questions. To avoid all of these issues, I have designed a new regrade policy in line with BU's new guidelines for academic integrity.
To submit a regrade request for a midterm question students must:

1. write me an e-mail. In that e-mail you should write:
    - Your name and student ID
    - The question you wish to submit a regrade for
    - Why do you believe you deserve more points on this question based on the answer key provided in the discussion session
    - Your e-mail must include the sentence "I acknowledge that if my regrade request is unsuccessful, I may be deducted a point from my overall score."
2. Drop off your exam with me after class or during office hours
3. If your request is awarded, I'll update Blackboard with your new grade. If it is not and I deem it excessively unmerited, **you will be deducted one point** for every question that's denied a regrade.
4. Ultimately, econometrics classes are graded "on a curve". Every "curve" means that you will be graded on your performance relative to the rest of the class. All of this procedure is to avoid having students abuse requests to "climb the curve" at other students' expense.

Very importantly:

- Exams will be scanned in this class (either in their entirety or a random sample).
- If the exam you submitted does not match our recorded exam copy, you will receive an F in the class and will be reported to the dean's office
- An entire discussion session is designed to go over the answer key of every midterm exam. If you miss the discussion session, it is your responsibility to retrieve notes from fellow students. I will not discuss specific exam questions after the discussion session has occurred.
- No regrade request will be addressed if it doesn't follow the guidelines above
- Exams will be available for pick up within 3 weeks of the original

- The procedure above does not apply to the final as there are no discussions on the answer key.
- Afer the final, I will schedule office hours within one week of receiving the grades. Students may come and collect their finals. If they wish to request a regrade, your **whole exam** will be regraded by me.

Week	(Tentative) Content
Week 1	• Introduction/recap
Week 2	• Linear Regression models and OLS • OLS properties • Discussion session: Programming session
Week 3	• OLS properties • OLS hypothesis testing • Discussion session: Derivation OLS estimator and exercises
Week 4	• OLS hypothesis testing • Bootstrapping • Discussion session: OLS standard errors
Week 5	• Review midterm 1 • **Midterm 1** • Discussion session: Review of Midterm 1 (answer key)
Week 6	• Non-linear Regression models and limited dependent variables • Non-linear Regression models and limited dependent variables • Discussion session: Probit, Logit, LPM, and polynomial regression
Week 7	• Omitted Variable Bias, Measurement Error, Selection Bias • Omitted Variable Bias, Measurement Error, Selection Bias • Discussion session: Omitted variable bias
Week 8	• Panel Regression and Interaction Terms • Panel Regression and Interaction Terms • Discussion session: No discussion (spring break)
Week 9	• Causality and Experimental Economics • Causality and Experimental Economics • Discussion session: Fixed effect, interaction terms, and their implementations
Week 10	• Instrumental Variables • Instrumental Variables • Discussion session: IV and its implementation
Week 11	• Review Midterm 2 • **Midterm 2** • Discussion session: Review of Midterm 2 (answer key)
Week 12	• Instrumental Variables • Difference in Difference • Discussion session: DID and its implementation
Week 13	• Difference in Difference • Regression Discontinuity Design • Discussion session: RDD and its implementation
Week 14	• Regression Discontinuity Design • Regression Discontinuity Design • Discussion session: Review for the Final
Week 15	• Review and Structural approach to Economics