# ECON 3720: Introduction to Econometrics
## University of Virginia

**Professor:** Jonathan Colmer (jonathan.colmer@virginia.edu)

**Office hours:** Tuesday: 2:00 – 5:00 pm (MH332)

**Lectures:** Tuesday and Thursday: 12:30 – 1:45pm (MH124)

**Classes:** Thursday: 6:00 – 6:50pm (NCH 338); 7:00 – 7:50pm (NCH 338); 8:00 – 8:50pm (MH111)

**Teaching Assistants:**

Ramiro Burga (rab9ze@virginia.edu)

Office hours: TBD

**Course Description:** Econometrics is about the use of statistical techniques in order to use data to answer economic questions. This combines of a thorough understanding of the techniques combined with a thoughtful approach to the questions of interest. The course will provide an introduction to the theory and practice of econometrics. This will include analysis of the properties of estimation methods, such as ordinary least squares (OLS); however, the focus will be on applied methods, helping you to foster the skills necessary to plan and execute empirical projects. We will study many examples and do a fair amount of number crunching ourselves. You will finish the course equipped with a familiarity with the tools of probability and statistics, facility with data handling and statistical programming, and – hopefully – a good understanding of the models and methods of econometrics.

**Prerequisites:**

Students should be familiar with basic concepts in probability and statistics. The course begins with a brief refresher just in case.

**Text and Readings:**

We will rely heavily on:

- Angrist, J. and Pischke, J.S. *"Mastering Metrics: The Path from Cause to Effect"*, Princeton University Press, 2014.
- Wooldridge, J. *"Introductory Econometrics: A Modern Approach"*, 5th Edition, South-Western College Publishing, 2012.

Journal articles and selected additional readings will be posted on Collab.

**Software:**

- Stata/IC. You can purchase the annual or perpetual license: https://www.stata.com/order/new/edu/gradplans/campusgradplan/
- Stata is also freely accessible on the hive: http://its.virginia.edu/hive/

**Grading:**

- Problem Sets (10%)
- Midterm (30%)
- Final (30%)

- Empirical Project (30%: 5% proposal, 25% project)

Your TA will lead the classes.

**Problem Sets:** 10% of your grade is banked. You can preserve this credit by turning in problem sets on time. You do not have to get everything right, or even complete everything to retain this credit. However, you must, in the judgment of the grader, make a reasonable effort on *all parts of all questions.* If you do not make a reasonable effort on all required parts you will lose 0.5 percentage points of your banked credit. If you fail to turn in a problem set or turn it in late you will lose 1 percentage point of your banked credit. You are welcome to work in groups; however, you cannot submit a problem set with more than 2 people's names on it. This does not mean you can't work in groups of more than 2 people. In fact your are encouraged to form study groups.

Solutions will not be posted on Collab. Solutions will be presented during discussion classes.

**Midterm Test:** Individual arrangements are not made for taking exams at alternative times. For students that are unable to take the exam at the allotted time due to varsity athletics or illness (both of which require evidence) a 0% weight will be allocated to the midterm exam. The final exam and empirical project will be reweighed to account for 45% of the overall grade.

**Final Test:** There is only ONE final examination for Mr Colmer's EC3720 class. If you are enrolled in a course that is also assigned this exam time then you should reschedule that exam or enroll in another EC3720 class immediately. There is no late option or makeup for the final exam.

**Grading Questions:** If you have a question about the grading of a test, you should submit a written appeal to you TA. If you are not satisfied, see me. All of this must be completed within 3 weeks of the test date.

**Discussion Classes:** If you have any questions about discussion classes please contact your TA directly. I will not respond to emails related to discussion classes.

**Email Responses:** For information, regarding the course your first port of call is the syllabus. I will usually respond to emails promptly; however, I will not respond to emails requesting information that is available within the syllabus.

**Add, Drop, and Withdrawal:** The last day to drop the lecture or a discussion section is . The last day to add a discussion section or to change a grade option is . The last day to withdraw is . A grade of W is given in all cases.

**Disabilities:** To discuss individual accomodations for disabilities as recommended by the Student Disability Access Center (SDAC) contact Mr Burga as early as possible. Any alternative testing arrangements granted by SDAC must be cleared by Mr Colmer seven days before each exam: neither you nor SDAC can determine these without our consent. We recommend that you do this in person rather than over e-mail. Any alternative testing arrangements MUST occur at the time of the test.

**Honor:** Because of the Honor System at Mr. Jefferson's University, I assume that students in EC3720 are truthful with teaching assistants and me and do not cheat on tests and assignments. In the unlikely event that you observe an incidence of cheating, I assume you will contact an Honor Advisor. Students deemed by Mr. Colmer to have violated the University's Honor System are **not** eligible for a final grade.

**Legal Notice:** Students are prohibited from selling notes from this course to any person or commercial firm (or being paid to take notes) without the express written permission of Mr Colmer.

**Our Contract:** This syllabus is an important document if you remain in the the course. Continued enrollment in the course indicates agreement with all the stipulations laid out in this document. All future discussions between you and me assume your agreement with this syllabus.

**Course Outline:**

**Part 1:**

Week 1: 28th August

1.  Big Picture and Motivation

Week 2: 4th September

1.  Review of Statistical tools
    a.  Probability
    b.  Expectations and Moments

*Discussion Class 1 (6th September): Introduction to Stata*

Week 3: 11th September

1.  Causality, Counterfactuals and Selection Bias.

2.  Experiments and Randomization

3.  Sampling Distributions and Statistical Inference

*Discussion Class 2 (13th September): Statistics Review*

Week 4: 18th September

4.  An Introduction to Regression

5.  Bivariate Regression and the Conditional Expectation Function

*Discussion Class 3 (20th September): Causality and Randomized Controlled Trials*

Week 5: 25th September

6.  Multivariate Regression

*Discussion Class 4 (27th September): Regression 1*

Week 6: 2nd October

7.  Inference in Regression

8.  Class Review and Practice Exam Questions

*Discussion Class 5 (4th October): Regression 2*

Week 7: 9th October (No class on the 9th)

- **Mid-term Exam on the 11th October**

*Discussion Class 6 (11th October): Cancelled*

Week 8: 16th October

9. Functional Form and Regression

10. Dummy Variables and Interactions

11. Controls and Measurement Error

*Discussion Class 7 (18th October): Midterm Review*

Week 9: 23rd October

12. Regression in Asymptopia

13. Standard Error Adjustments

*Discussion Class 8 (25th October): Regression 3.*

Week 10: 30th October

14. Instrumental Variables (IV)

15. Generalizing IV – 2SLS

16. Understanding IV

*Discussion Class 9 (1st November): Regression 4.*

Week 11: 6th November

17. Simultaneous Equations Models: Motivation and Identification

*Discussion Class 10 (8th November): Instrumental Variables 1*

Week 12: 13th November

18. Introduction to Panel Data

19. Differences-in-Differences

*Discussion Class 11 (15th November): Instrumental Variables 2*

Week 13: 20th November (Thanksgiving Recess)

Week 14: 27th November

20. Regression Discontinuity Design

*Discussion Class 12 (29th November): Fixed Effects and Differences-in-Differences*

Week 15: 4th December

**Final Exam Date: 11th December (2:00-5:00pm)**