

**Economics 470**  
**Introduction to Econometrics**  
**Course Syllabus for Fall 2021**

**Course Time**

- Section 1: Tuesdays and Thursdays, 12h30pm-1h45pm.
- Section 2: Tuesdays and Thursdays, 9h30am-10h45am.
- Gardner Hall, Room 008.

**Instructor**

Valentin Verdier

Office Hour: Tuesdays, 11am-12h15pm. Online, see Sakai for Zoom instructions.

Course Website: Sakai

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**Teaching Assistants**

Katsu Nishiyama (4th year PhD student)

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Office Hour: Mondays and Wednesdays, 10am-11h30am. Online, see Sakai for Zoom instructions.

Dihan Zou (1st year PhD student)

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Office Hour: Mondays and Wednesdays, 2pm-3pm. Online, see Sakai for Zoom instructions.

Eric Miller (Senior, econ major)

E-mail: ericmm@live.unc.edu

Office Hour: Tuesdays and Thursdays, 4pm-5pm. In-person and online, see Sakai for location and Zoom instructions.

## Textbook (Optional but very strongly recommended)

*Introductory Econometrics*, edition 4, 5, or 6, Jeffrey Wooldridge, Thomson SouthWestern 2009 or 2012 or 2015. This is an expensive but excellent textbook. You can buy a used 4th edition book for not too much money. (Used 5th edition in paperback: \$14.56 on Amazon.)

## Statistical Software

Many of our problem sets will require the use of STATA. You need to make sure that you have a reliable access to Stata to complete these problem sets. It can be accessed from library computers, from virtual lab, or it can be purchased with a 6 months student license (<https://www.stata.com>). The version: Stata/BE is sufficient for this course, and is priced at \$48). You can contact the UNC library system or UNC ITS if you have issues with accessing Stata. Issues with access to Stata will not be accepted as an excuse for not turning in a problem set.

## Course Objectives

Econometrics is the name of the quantitative methods used to answer questions originated from economic theory using economic data that document the behavior of economic agents or the history of objects of interest to economists (GDP, stock prices,...). Econometrics has generated a huge amount of research over the last decades, hence it is not possible to cover the entire field (or even a significant portion of it) in a semester. However, one of the goals of this course is to equip students with enough knowledge so that they can answer in a simple but informative way empirical questions they will face in professional or academic settings.

The other objective of this course is to lay the foundations for further training in econometrics, either at your future job or in more advanced courses.

Thus this course will try to balance theory and applications. Both of these are complementary and **require a lot of practice**. This is a technical course, and the key to success is to read the textbook to fully grasp the material and to practice as much as possible using the problem sets and the exercises at the end of the chapters.

The most important objective of this course is to teach a new approach to data analysis. Econometric analysis relies on linking a story about the real world (a model) to a particular method for using the data at hand to learn about objects of interest. We need to learn how to establish this kind mapping formally, **which means writing mathematical proofs**. Several students have never worked on a formal proof before this course and we will develop the tools needed together, but again lots of practice and making sure that you

are on top of the material throughout the semester is key for success. When confronted to a particular empirical application in this course, being able to describe precisely the assumptions that justify a particular method and refer precisely to the properties of the methods used under these assumptions will be just as important as the practical implementation of these methods in Stata.

### Course Requirements

There will be around six problem sets. There will also be two midterm exams and a final exam. All exams will be in-class and closed book.

Dates for the exams will be announced during lecture as they will depend on how much time is spent on the Math and Stats review. The first midterm will occur soon after the review on mathematics and statistics is over. The second midterm will occur as soon as Part 1 of the syllabus is over. The final exam will take place during the time slot allocated by the registrar's office. At the end of most lectures, I will also administer a short multiple-choice quiz using Poll Everywhere.

The grades will be weighted as following:

- 5% end-of-lecture quizzes
- 15% Problem sets
- 17.5% First midterm
- 30% Second midterm
- 32.5% Final

The final grade will be determined by the following table:

Final Grade	From	To
4.0	93.00%	100%
3.7	90.00%	92.99%
3.3	84.92%	89.99%
3.0	81.67%	84.91%
2.7	78.42%	81.66%
2.3	74.08%	78.41%
2.0	70.83%	74.07%
1.7	67.58%	70.82%
1.3	63.25%	67.57%
1.0	60.00%	63.24%
0.0	0.00%	59.99%

### Prerequisites

Econ 410 and 400, with a grade of C or better in each.

### Academic Integrity

This course will be consistent with university policies, see

<https://studentconduct.unc.edu>.

### **Additional notes**

Please feel free to contact me with any question or concern you might have.

Students who require accommodation for a disability should contact me as soon as possible to set up arrangements.

## **Course outline and Reading List**

### **Introduction**

Chapter 1

### **Mathematics and Statistics review**

Appendices A, B and C

### **Part 1: Econometrics with cross-sectional data**

#### **Simple regression**

Chapter 2

#### **Multiple regression: Estimation**

Chapter 3

#### **Multiple regression: Inference**

Chapter 4

### **Part 2: Econometrics with panel data**

#### **Pooling cross sections across time**

13.1, 13.2

#### **Simple solutions to unobserved heterogeneity**

13.3, 13.4, 13.5

Accounting for time-varying aggregate shocks

Part 3: Additional topics on multiple regression (if time permits)

6.1, 6.2, 6.4, 7.1, 7.2, 7.3, 7.4, 7.6

Part 4: Asymptotic Theory and Inference (if time permits)

Weak laws of large numbers and central limit theorems

Inference without normality in regression analysis

5.1, 5.2

Inference with heteroscedasticity

8.1, 8.2

Inference without random sampling

1. Panel Data

2. Time Series