Princeton University **Spring 2025**
Department of Economics **ECO 302**

Econometrics

Syllabus: Version 2b (January 27, 2025)

Instructor:	Mikkel Plagborg-Moller (mikkelpm@princeton.edu)
Lectures:	Mon/Wed 11.00am–12.20pm, JRR A17
Office hours:	Mon 2.00pm–3.00pm, JRR 282
Assistant-in-Instruction:	Max Alston (alston@princeton.edu)
Undergrad Course Assistants:	Amelia Feiner, Taehwan Kim, Maiya Raghu, Alexandra Roberts, Sebastic Sec
Web page:	https://princeton.instructure.com/courses/17376

Description. This course is an introduction to econometrics. Econometrics is a subdiscipline of statistics that provides methods for inferring economic structure from data. This course has two goals. The first goal is to give you means to evaluate an econometric analysis critically and logically. Second, you should be able to analyze a data set methodically and comprehensively using the tools of econometrics.

Prerequisites. ECO202 (or ORF245 or POL345+POL346) and MAT175 (or ECO201 or equivalent) are required. ECO100 and ECO101 are recommended, but not required.

Lecture format. The default is that lectures and precepts will be in person. Attendance is expected but not mandatory. Recording of lecture or precepts without permission will be considered a violation of course policy.

Readings. Optional textbook:

- Stock and Watson, *Introduction to Econometrics*, Pearson, 4th edition. We will cover most of the first 15 chapters.

Lecture slides will be posted on the course website. The slides are self-contained if supported by attendance at the lectures. However, you are strongly encouraged to read along in the Stock & Watson textbook as well. It is especially useful to read the empirical examples in the book.

Requirements/grading.

In-class tests: 40%.

- There will be two 75-minute, closed-book in-class tests. You are allowed to bring a calculator. For the first test, you may bring a double-sided, letter-size cheat sheet; for the second test, you may bring two of these.

  The tests are required and cannot be rescheduled. If you miss any of these tests, then the final will be reweighted appropriately, provided that this is endorsed by the relevant dean.

Final exam: 40%.

- There will be a 3-hour in-person, closed-book final exam. You are allowed to bring a calculator and a two-page, double-sided, letter-size cheat sheet.

Problem sets: 20%.

- There will be approximately one problem set per week. You are encouraged to discuss problem sets with your classmates, but problem sets should be written and submitted individually. Direct copying is not permitted and will be treated as cheating.

  We will ignore the two lowest problem set grades. We do not accept late problem sets, except in extraordinary circumstances: (i) a documented serious illness or distressing experience, or (ii) a major event that cannot be rescheduled and that you let us know about well before the deadline. Please immediately contact the Instructor in such circumstances.

We reserve the right to subtract points for sloppy exposition, including unreadable code or poor document structure. If you find a grading error, please resubmit your problem set or test along with a one-paragraph explanation to the Assistant-in-Instruction, at most one week after grades have been posted. Re-grading will be done by the Instructor or Assistant-in-Instruction. We reserve the right to re-grade the entire problem set.

Computer work. Computer work is an integral part of econometrics, and the problems that will be assigned assume general computer literacy. Lectures, precepts, and problem sets will emphasize use of the software package Stata, but you may use other equivalent software packages for problem sets if you wish. You are expected to spend time during the first weeks to familiarize yourself with the necessary software.

Timing of events.

- Problem sets will generally be posted on Mondays and due the following Tuesday morning.
- Precepts will start the first week. The first precept will introduce Stata.
- The two in-class tests are scheduled for Mar 5 and Apr 16.
- The final exam has been tentatively scheduled by the registrar for May 10 at 8.30 am.

Code of conduct. All course activities, including class meetings and homework assignments, are subject to the university's academic code and code of conduct as detailed in the "Rights, Rules, Responsibilities" publication. If you use GAI tools (such as Github CoPilot) on an assignment, you must describe how you used the tool and include both the prompt and the relevant output. Using these tools without disclosing when and how you used them is a violation of the University's academic regulations (see Section 2.4.6 of the aforementioned publication).

Accommodations for students with disabilities. Students must register with the Office of Disability Services (ODS) (ods@princeton.edu; 258-8840) for disability verification and determination of eligibility for reasonable academic accommodations. Requests for academic accommodations for this course need to be made at the beginning of the semester, or as soon as possible for newly approved students, and again at least two weeks in advance of any needed accommodations in order to make arrangements to implement the accommodations. Please make an appointment to meet with the instructor in order to maintain confidentiality in addressing your needs. No accommodations will be given without authorization from ODS, or without advance notice.

Course outline. The following outline is preliminary and may change without warning.

1. What is econometrics and why is it useful? (Stock and Watson, chapter 1).
2. Linear regression.
   i) Regression with one regressor (Stock and Watson, chapters 4–5).
   ii) General case (Stock and Watson, chapters 6–8).
   iii) Assessing studies based on regression (chapter 9).
3. Panel data (Stock and Watson, chapter 10).
4. Binary choice (Stock and Watson, chapter 11).
5. Instrumental variables (Stock and Watson, chapter 12).
6. Experiments and quasi-experiments (Stock and Watson, chapter 13).
7. (Time permitting:) Prediction with many regressors (Stock and Watson, chapter 14).
8. Introduction to time series (Stock and Watson, chapter 15).

We will review probability and statistics (Stock and Watson, chapters 2–3) as needed along the way. The relevant topics include:

- Random variables, probability distributions, and densities. Expectations. Multivariate distributions, conditional distributions, and independence. Special distributions: Bernoulli, normal, chi-squared, F, and T.
- Estimators and their properties. Confidence intervals and hypothesis testing.