

## Economic Statistics and Econometrics I - Second Half

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### Course Description

This course is an introduction to probability and statistics and econometric methods designed for first year economics Ph.D. students. The first half of the course covers probability and statistics, and will be taught by Prof. Xiaoxia Shi. The main emphasis in the second half of the semester will be linear regression, which provides a foundation for applied work in economics and for further study in econometrics. The second half will be taught by Prof. Jack Porter.

This course is designed for first-year Economics PhD students. The course prerequisites are intermediate calculus and linear algebra.

*Credits:* This is a 3-credit course for graduate students, 4-credits for undergraduate students.

*Canvas URL:* <https://canvas.wisc.edu/courses/360270>

*Course Designations*

Level - Advanced

L&S Credit – Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts towards 50% graduate coursework requirement

*Instructional Mode:* Lectures, readings, problem sets

### Lectures and Sections

This class meets weekly for two 75-minute lectures plus one 50-minute discussion section and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc.) for about 3-4 hours out of classroom for every class period.

*Lectures:* Mondays and Wednesdays 9:30 - 10:45

*Sections:* Thursdays 3:30, Fridays 12:05, 3:30, 4:35

## Books

*Econometrics*, BY BRUCE HANSEN

(<https://www.ssc.wisc.edu/~bhansen/econometrics/>)

Alternate References:

*A Course in Econometrics*, BY A. GOLDBERGER

*Econometric Analysis*, BY W. GREENE

*Econometrics*, BY F. HAYASHI

*Econometric Analysis of Cross Section and Panel Data*, J. WOOLDRIDGE

## Problems Sets and Exams

Problem sets will be assigned approximately weekly and will be discussed in the section meetings. Grades will be based on exams (80%) and the problem sets (20%). The grades from the two halves will be averaged to obtain the semester grade.

*Mid Semester Exam*: TBD (Oct 26-28)

*End Semester Exam*: Monday December 18

## Course Learning Outcomes

- Intermediate-level probability theory
- Intermediate-level statistical theory
- Finite sample and asymptotic inference theory
- Maximum likelihood, method of moments, hypothesis testing
- Conditional expectations, linear projection, and linear regression
- Theory of least squares estimation
- Estimation of economic models

## Second Half Course Outline

(Parenthetical chapters/sections refer to Hansen: *Econometrics*)

- Conditional Expectations and Best Linear Predictors (Chaps 1, 2)
  - Ordinary Least Squares and Gauss-Markov (Chaps 3, 4)
  - Small Sample and Large Sample Inference (Chaps 5, 6, 7)
  - Restrictions and Hypothesis Testing (Chaps 8, 9)
  - Machine Learning (Chap 29)
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## **Proctoring**

Instructors have the authority to decide whether to proctor their tests, quizzes or other course assessments whether the courses is delivered in-person or remotely. Failure to use the proctoring service assigned will result in zero on the exams.

## **Mental Health and Violence Prevention Resources**

As a student you may experience a range of issues that can cause barriers to learning. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, or loss of motivation. University Health Services is here to help with these or other issues you may experience. You can learn about the free, confidential mental health services available on campus by calling 608-265-5600 or visiting [uhs.wisc.edu](http://uhs.wisc.edu). Help is always available.

Experiences of sexual assault, sexual harassment, dating violence, domestic violence, and stalking affect many students on this campus and can create barriers to learning. UW-Madison is committed to fostering a safe, productive learning environment and offers a variety of resources and options for students impacted by violence. Learn about the free, confidential services available on campus and in the community by visiting [www.uhs.wisc.edu/assault](http://www.uhs.wisc.edu/assault).

## **Institutional Statement on Diversity**

Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background - people who as students, faculty, and staff serve Wisconsin and the world.

See also: <https://econ.wisc.edu/dei-wiecon-home/>

## **Accommodations for Students with Disabilities**

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.

## **Grievance Procedure**

The Department of Economics has developed a grievance procedure through which you may register comments or complaints about a course, an instructor, or a teaching assistant.

The Department continues to provide a course evaluation each semester in every class. If you wish to make anonymous complaints to an instructor or teaching assistant, the appropriate vehicle is the course evaluation. If you have a disagreement with an instructor or a teaching assistant, we strongly encourage you to try to resolve the dispute with him or her directly. The grievance procedure is designed for situations where neither of these channels is appropriate.

If you wish to file a grievance, you should go to room 7238 Social Science and request a Course Comment Sheet. When completing the comment sheet, you will need to provide a detailed statement that describes what aspects of the course you find unsatisfactory. You will need to sign the sheet and provide your student identification number, your address, and a phone where you can be reached. The Department plans to investigate comments fully and will respond in writing to complaints.

Your name, address, phone number, and student ID number will not be revealed to the instructor or teaching assistant involved and will be treated as confidential. The Department needs this information, because it may become necessary for a commenting student to have a meeting with the department chair or a nominee to gather additional information. A name and address are necessary for providing a written response.

Updates can be found here:

<https://econ.wisc.edu/doctoral/program-guidelines/#Grievance-Procedures>

## **Misconduct Statement**

Academic Integrity is critical to maintaining fair and knowledge-based learning at UW Madison. Academic dishonesty is a serious violation: it undermines the bonds of trust and honesty between members of our academic community, degrades the value of your degree and defrauds those who may eventually depend upon your knowledge and integrity.

Examples of academic misconduct include, but are not limited to: cheating on an examination (copying from another student's paper, referring to materials on the exam other than those explicitly permitted, continuing to work on an exam after the time has expired, turning in an exam for regrading after making changes to the exam), copying the homework of someone else, submitting for credit work done by someone else, stealing examinations or course materials, tampering with the grade records or with another student's work, or knowingly and intentionally assisting another student in any of the above. Students are reminded that online sources, including anonymous or unattributed ones like Wikipedia, still need to be cited like any other source; and copying from any source without attribution is considered plagiarism.

The Department of Economics will deal with these offenses harshly following UWS14 procedures:

1. The penalty for misconduct in most cases will be removal from the course and a failing grade,
2. The department will inform the Dean of Students as required and additional sanctions may be applied.
3. The department will keep an internal record of misconduct incidents. This information will be made available to teaching faculty writing recommendation letters and to admission offices of the School of Business and Engineering.

If you think you see incidents of misconduct, you should tell your instructor about them, in which case they will take appropriate action and protect your identity. You can also

choose to contact our department administrator, Tammy Herbst-Koel (therbst@wisc.edu), and your identity will be kept confidential. For more information, refer to <https://conduct.students.wisc.edu/academic-misconduct/>