ECON 806
Econometrics I
Probability and Statistics for Econometrics

P.W. Wilson Spring 2021

Class location and time: Online via Zoom, Tuesday and Thursday, 2:00–3:15pm
Office: 320A Wilbur O. and Ann Powers Hall
Office hours: Online, by appointment.
Email: pww@clemson.edu
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Required texts:


Other texts that might be useful:


Additional course materials:

You can find additional course materials by going to my home page (see above), clicking on the link entitled “course materials for students,” and following the obvious links.

Course objectives:

This course is aimed at first-year Ph.D. students in econometrics. The course provides intellectual tools essential for understanding concepts used in Econometrics II and Econometrics III (i.e., ECON 807 and ECON 808). Some of these tools may also be useful for microeconomic theory. A goal of this course is to provide a logically coherent methodological framework by linking probability theory and statistical inference to provide an approach to empirical modeling.

Economists often look at data to test implications of theoretical economic models or otherwise learn about agents’ response to varied incentives or other economic behavior. Note, however, that it is not possible to learn “truth” from data; typically, the best that one can hope for is to make a probabilistic statement about the phenomenon of interest after examining data. Statistical and econometric theory are essential for quantifying what can
be learned from data. Consequently, this course deals with theory necessary for applied, empirical work. One should not attempt empirical research without a solid understanding of theory necessary to quantify what might be learned from data.

Exams will be designed, as far as possible, to assess students’ higher-order thinking, as opposed to low-level knowledge (regurgitation, description) and comprehension (rephrasing of memorized facts). Higher-order thinking in the context of this course is associated with the ability to implement and use methods for statistical estimation and inference; to synthesize concepts in order to design approaches for estimation and inference; to analyze and compare different approaches for estimation and inference; and to analyze data and draw reasonable conclusions supported by the data.

It is not possible to cover in a single-semester course all the tools that will be useful for a career as an economist. Some additional tools will be developed in Econometrics II and III, but even then additional learning will be required. This course, as well as those that follow, should give students sufficient background to be able to read, understand, and assimilate material from journal articles and advanced textbooks. The topics covered in this course provide a foundation consisting of the most essential, fundamental concepts that are necessary for further learning.

Requirements:

Students are expected to have a working knowledge of calculus and matrix algebra. In addition, students should possess basic computer skills, and the ability to read and understand software documentation.

I will make reading assignments in class. Students should review material from the previous class as well as any reading assignments before each class.

Class attendance is not mandatory in the sense that I will not check the class roster in each class. However, it is not possible to pass this class (or any other worthwhile graduate-level class) without attending and actively engaging in the intellectual exercises that take place in class. Consequently, students should act as if class attendance is mandatory.

Course grade determination:

Students will have the following opportunities to demonstrate their abilities: homework assignments (10%); one midterm exam (30% each); and a final exam (60%). I expect the homework assignments to be done individually. However, I encourage you to consult with each other regarding how one might approach a given problem. Please note that copying someone else’s work is not permitted—I encourage only a discussion of approaches to solutions. The homework assignments may include problems as well as empirical exercises, and will serve to reinforce material discussed in class.

The relative weightings shown above are approximate. In particular, homework assignments are mandatory, as is class attendance. Shirking will result in (perhaps severely) reduced grades.

Grades on exams, homework, or other assignments may be challenged by presenting a well-written, well-reasoned argument. Any such challenge must be typed on paper and either given to me or one of the department’s secretaries within 24 hours after receipt of the graded exam, homework, etc. For this purpose, only hard copies will be accepted; cases submitted by email will not be considered. I am happy to discuss concepts, etc. at any time, but will consider changes to assigned grades only within the framework described here. Do not ask me questions such as, “why did I receive $x$ points less than so-and-so?”

You are responsible for taking exams and handing in homeworks at the beginning of class on the day when due. Please note that homework submitted late will receive a grade of zero. All students must take the midterm and final exams. In the event of a serious medical
problem, other arrangements will be made after sufficient evidence of a serious medical problem is provided. To avoid possibly unpleasant outcomes, students are advised to make such arrangements before missing an exam.

Office hours:

Due to the on-going COVID-19 pandemic, all lectures will be given on-line using Zoom. Links will be emailed before the first class. In order to protect students’ health as well as my own, I will hold office hours online, also via zoom. If you wish to discuss with me outside of class, I will be happy to do so... send me an email, and I will provide a Zoom link so that we can meet. I regret that we cannot meet in person, but given the features of the pandemic, it does not seem safe to do so.

Topics:

1. Probability and Measure
2. Borel Measurability, Integration, and Mathematical Expectations
3. Conditional Expectations
4. Distributions and Transformations
5. Multivariate Normal Distribution and Inference
6. Modes of Convergence
7. Limit Theorems
8. Robustness

Other topics may be covered as time permits. I reserve the right to revise the above list as the course progresses, but will make relevant announcements in class.
Clemson University requires that course syllabi contain the following statements:

- “Students with disabilities requesting accommodations should make an appointment with Dr. Arlene Stewart (656-6848), Director of Disability Services, to discuss specific needs within the first month of classes. Students should present a Faculty Accommodation Letter from Student Disability Services when they meet with instructors. Accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester.”

- “Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran’s status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at http://www.clemson.edu/campus-life/campus-services/access/title-ix/. Mr. Jerry Knighton is the Clemson University Title IX Coordinator. He also is the Director of Access and Equity. His office is located at 111 Holtzendorff Hall, 864.656.3181 (voice) or 864.565.0899 (TDD).”