

Econometrics

Instructor:	Jay Lee
Email:	jeongwoo@ufl.edu
Office:	MAT 324
Office Hours:	T & R 12:00 PM - 1:00 PM or by appointment

TA:	Anand Mathew
Email:	anand.mathew@ufl.edu
Office:	MAT 301A
Office Hours:	M 10:00 AM - 12:00 PM

Course Description This course covers the statistical tools necessary to understand empirical economic research. The course emphasizes theoretical concepts used by economists to summarize, estimate, and communicate economic relationships, as well as to evaluate policy. Topics include simple and multiple regression analyses with cross-sectional data, statistical inference, hypothesis testing, and OLS asymptotics.

Course Objectives The course aims to achieve the following objectives:

1. Develop a comprehensive understanding of the theoretical concepts used by economists to summarize, communicate, and estimate economic relationships, as well as to evaluate policy implications.
2. Gain practical intuition for key statistical concepts, including ordinary least squares, standard errors, hypothesis testing, and confidence intervals.
3. Build foundational skills in working with data.
4. Acquire a basic understanding of the R statistical programming language.
5. Use simulation in R to apply theoretical concepts and explore the implications of incorrect assumptions through hands-on practice.
6. Recognize and critically assess the risks of relying on assumptions that are often violated in economic analyses.

Prerequisites

- Introduction to Statistics 1 (STA 2023)
- Survey of Calculus (MAC 2233) or higher level of math courses
- Intermediate Microeconomics (ECO 3101) or Managerial Economics (ECP 3703)

Students are expected to have a foundational understanding of probability theory and statistical inference, as well as basic calculus. They should be comfortable with drawing and interpreting graphs, taking partial derivatives, and using algebra to manipulate equations. If you have any questions or concerns about these prerequisites, I will be happy to discuss them during the first week of the semester.

Course Materials

- Lecture slides will be uploaded to Canvas after each class.
- The primary recommended textbook for the course is the following:
 - James H. Stock and Mark W. Watson, *Introduction to Econometrics*, 4th ed., Pearson
- The following textbooks are optional but recommended for additional reference:
 - Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*. 7th ed., Cengage Learning
 - Joshua D. Angrist and Jörn-Steffen Pischke, *Mastering 'Metrics: The Path from Cause to Effect*, Princeton University Press

Class discussions serve as the primary source of material, with lecture slides summarizing the key points. Textbooks can be used as a supplementary resource to clarify concepts covered in class or to reinforce ideas introduced during lectures. Students are also encouraged to use textbook problems for additional practice and self-study. Relevant chapters for each class will be announced in advance.

Software and Programming Problem sets are recommended to be completed using L^AT_EX and submitted as PDF files. Overleaf, a free and user-friendly online L^AT_EX editor, is highly recommended. For those who prefer an offline option, TeXstudio is a suitable alternative. No prior knowledge of L^AT_EX is required. A brief session on using Overleaf will be provided during a lecture to help you get started.

Some problem sets in the course will involve simulation or empirical analysis, requiring the use of statistical software. The designated software for this course is R, and RStudio is recommended as a more user-friendly interface for using R. No prior knowledge of R or programming experience is required; however, a willingness to learn is essential. It is recommended that you install R and RStudio Desktop (both free and open source) on your personal computer. If this is not convenient, R and RStudio are available on many campus computers, such as those in the Marston Science Library, and through UF Apps.

Course Requirements Each week consists of two lectures, including recitations. In addition to class discussions and lecture slides, students will complete after-class quizzes and six problem sets. The quizzes will be conducted through Canvas. The problem sets include both analytical exercises and computer-based tasks, with statistical analysis performed using R. Support for new R and L^AT_EX users will be provided during recitations.

Evaluation Your final grade will be determined based on your performance on exams, problem sets, and quizzes. The grading breakdown is as follows:

Exam 1	20%
Exam 2	30%
Exam 3	30%
Problem Sets	15%
Quizzes	5%

Your final letter grade¹ will be determined as follows:

93 – 100	<i>A</i>
90 – 92.99	<i>A–</i>
87 – 89.99	<i>B+</i>
83 – 86.99	<i>B</i>
80 – 82.99	<i>B–</i>
75 – 79.99	<i>C+</i>
70 – 74.99	<i>C</i>
65 – 69.99	<i>C–</i>
60 – 64.99	<i>D+</i>
55 – 59.99	<i>D</i>
0 – 54.99	<i>E</i>

Exam Dates

Exam 1: Tuesday, Feb 11th in class
Exam 2: Thursday, Mar 13th in class
Exam 3: Tuesday, Apr 22nd in class

Exams will be conducted in the classroom, and you are required to bring a fully charged laptop to take the exam. The exams will be administered through the Canvas quiz platform, even though they are conducted in person. (Honorlock proctoring will not be used for this course.) You may use a standalone calculator with no communication functions. However, the calculator feature on phones or laptops is not permitted. There will be no cumulative exams. However, understanding the concepts covered in earlier chapters is essential for progressing to more advanced material.

Make-up Exams If you have an excused conflict (e.g., a religious holiday) with any exam this semester, please email me by the end of the first week of class. Make-up exams will be offered only in cases where you are unable to take an exam for a valid reason as defined by UF policy. In such cases, you must notify me prior to the start of the exam and provide valid documentation within one week to justify your absence.² Supporting documentation must include contact information for verification purposes. Failure to comply with these rules will result in a zero score for the missed exam. Providing false documentation or fabricating an excuse constitutes academic misconduct under University guidelines. UF's policy on academic honesty will be strictly enforced.

Problem Sets There will be six problem sets assigned during the course. While collaboration is encouraged, each student must submit their own solutions.

Solutions should be submitted through Canvas. If you choose to handwrite your solutions, they must be legible, scanned, and uploaded to Canvas. Scanned submissions should be of high quality and professionally presented. Handwriting must be clear, and graphs must be accurate. Responses that are ambiguous or unclear will not receive credit.

All problem sets are due by 11:59 PM on the designated due date. Late submissions will not be accepted and will receive zero credit. The due dates are as follows.

¹More information on grades and grading policies is here: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

²<https://shcc.ufl.edu/forms-records/excuse-notes/>

Problem Set 1: Monday, Jan 27th, 11:59PM.
Problem Set 2: Monday, Feb 3rd, 11:59PM.
Problem Set 3: Friday, Feb 28th, 11:59PM.
Problem Set 4: Friday, Mar 7th, 11:59PM.
Problem Set 5: Monday, Apr 7th, 11:59PM.
Problem Set 6: Monday, Apr 14th, 11:59PM.

Quizzes There will be approximately one quiz per class, with a maximum of 20 quizzes throughout the semester. You may refer to textbooks or your notes while completing these quizzes. Quizzes must be submitted through Canvas by 11:59 PM on the day following each class. Late submissions will not be accepted and will receive zero credit. At the end of the semester, your final quiz score will be based on your best 15 quiz scores. Each of these 15 scores will be equally weighted to determine your overall quiz average.

Extra Credit I will provide several opportunities for extra credit in class throughout the semester. These opportunities are designed exclusively for class attendees and aim to facilitate learning new concepts. If you attend class via Zoom due to illness, your ability to participate in extra credit activities may be limited, though you will still be able to join the class. Extra credit will not be available to those who do not attend classes live.

While extra credit is unlikely to have a significant impact on your overall grade, it may help improve your letter grade if you are on the borderline. All extra credit points will be added to your quiz scores. It is possible for your total quiz grade to exceed the maximum score, potentially offsetting lower exam grades.

Class Attendance Class attendance is required. Excused absences are consistent with university policies in the undergraduate catalog³ and require appropriate documentation. If you are sick but still want to attend class, you can access the Zoom link for the class on Canvas.

Class Recording Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

Course Communications All class activities will take place during our assigned class time, and you are expected to be available during those times. As this is a face-to-face course, you are required to remain in Gainesville throughout the semester. You are responsible for all information provided during class and on Canvas. Please confirm your availability for exams, problem sets, and quizzes before the end of Drop/Add Week and adjust your schedule as needed.

Most one-on-one communication will be conducted via email. The key course policies regarding email are as follows: 1) You are expected to check your email at least once per day. 2) All emails you send must adhere to basic standards of professional correspondence.

³<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Course Evaluation Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

University Honesty Policy UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.” On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code⁴ specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class.

Generative AI related Policy The Department of Economics faculty assume that all work that is submitted for grading is written by the student whose name it bears, and that it represents their ideas and work. Accordingly, students are not permitted to use generative AI when completing assignments, quizzes, exams, or other graded work unless their instructor has expressly granted that permission. Unauthorized use of generative AI may constitute cheating and/or plagiarism. Such violations of the UF Student Honor Code will be reported to the UF Dean of Students Office and will be subject to severe sanctions. Generative AI includes but is not limited to ChatGPT, DALL-E, and Google Bard.

Students with Disabilities Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://disability.ufl.edu>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

⁴<https://sccr.dso.ufl.edu/process/student-conduct-code/>

Campus Resources

U Matter, We Care If you or a friend is in distress, please contact umatter@ufl.edu or 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

GatorWell Health Promotion Services For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

UF Teaching Center The UF Teaching Center offers guidance on study skills and tutoring services. You can find more information at: <https://umatter.ufl.edu/office/teaching-center/>

Course Outline

1. Introduction to Econometrics

- Week 1: [Statistics vs. Econometrics]
- Week 2: [Population vs. Sample]
- Week 3: [Simple Regression Analysis]
- Week 4: [Specification and Econometric Model]
- Week 5: [Exam 1]

2. Inference

- Week 1: [Binary Explanatory Variable and Causal Effects]
- Week 2: [Goodness of Fit]
- Week 3: [Confidence Interval]
- Week 4: [Testing Hypotheses]
- Week 5: [Exam 2]

3. Multiple Regression Analysis

- Week 1: [Multiple Regression Analysis]
- Week 2: [Misspecification]
- Week 3: [Testing Hypotheses in Multiple Regression]
- Week 4: [Empirical Research]
- Week 5: [Exam 3]

Day-by-Day Checklist

This schedule is tentative and subject to change.

SW : James H. Stock and Mark W. Watson, *Introduction to Econometrics*, 4th ed., Pearson

Wld : Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*. 7th ed., Cengage Learning

	Date	[SW]	[Wld]	Important Date
1	Jan 14	[SW] 1	[Wld] 1	
2	Jan 16	[SW] 2.1 and 2.4	[Wld] B-1, B-2, and B-5	
3	Jan 21	[SW] 2.2 and 2.3	[Wld] B-3 and B-4	
4	Jan 23	[SW] 3.1	[Wld] C-1	
5	Jan 28	[SW] 4.1 and 4.2	[Wld] 2-1, 2-2, and 2-3	Problem Set 1 Due: Jan 27
6	Jan 30	[SW] 4.5	[Wld] 2-5	
7	Feb 4		Review for Exam	Problem Set 2 Due: Feb 3
8	Feb 6		Review for Exam	
9	Feb 11			Exam 1
1	Feb 13	[SW] 5.3	[Wld] 2-7	
2	Feb 18	[SW] 4.4	[Wld] 2-3c	
3	Feb 20	[SW] 4.3	[Wld] C-5 and 4-3	
4	Feb 25	[SW] 5.2	[Wld] 4-3	
5	Feb 27	[SW] 5.6	[Wld] C-6	Problem Set 3 Due: Feb 28
6	Mar 4	[SW] 5.1	[Wld] 4-2	
7	Mar 6		Review for Exam	Problem Set 4 Due: Mar 7
8	Mar 11		Review for Exam	
9	Mar 13			Exam 2
1	Mar 25	[SW] 6.2 and 6.3	[Wld] 3-1 and 3-2	
2	Mar 27	[SW] 6.1	[Wld] 3-3b and 3-3c	
3	Apr 1	[SW]	[Wld] 3-3a	
4	Apr 3	[SW] 6.7	[Wld] 3-4	
5	Apr 8	[SW] 7.1	[Wld] 4-2 and 4-3	Problem Set 5 Due: Apr 7
6	Apr 10	[SW]	[Wld] 4-2f and 19	
7	Apr 15		Review for Exam	Problem Set 6 Due: Apr 14
8	Apr 17		Review for Exam	
9	Apr 22			Exam 3

Jan 27 - Jan 29 *University of Florida Career Showcase

Mar 15 - Mar 22 *Spring Break

Apr 12 - Apr 21 *Faculty Course Evaluation