Professor Kevin Mumford
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3 Credit Hours: Async-Online
CRN: 17971 (Y0Z), 13603 (DYZ)

Online Office Hour (Zoom):
- Wednesdays 8:00 – 9:00 PM Eastern

Course Website:
https://purdue.brightspace.com

Course Description

This masters-level course in econometrics covers the tools that will enable students to conduct empirical analysis using economic data. The course examines the statistical techniques used in testing economic theories, estimating causal effects, and making predictions. Emphasis is placed on estimating a single equation and the problems associated with such estimation. In addition to multivariate OLS regression, students will be introduced to other regression methods including: instrumental variables estimation, time series estimation, and panel data methods. As part of the course, students will use Stata, a statistical software package.

You may have heard that this is a difficult course. This is because the course covers a lot of challenging material. I will do my best to help you develop a solid understanding of econometrics. One reason many students find the course to be challenging is because the new material presented each week builds on the material that came before. My advice is that you read the assigned textbook chapter, watch the videos, complete the homework and then attend an office hour if there are things you still don't understand. Don't get behind. There is a problem set due every week. This is not the kind of course that you can wait until just before the exam to start studying.

Learning Outcomes

By the end of the course, you are expected to be able to:
- Understand the theoretical foundations of linear regression methods
- Estimate linear regression model parameters and perform basic tests using Stata
- Interpret regression results and identify the sources of estimation bias
- Complete an empirical data analysis project including: formulating an econometric model, preparing the data, using appropriate estimation methods and tests, interpreting the results, and preparing a written report summarizing the methods and results

Required Textbook
All students are expected to obtain a copy of the textbook: *Introductory Econometrics: A Modern Approach* (ISBN: 978-1337558860) by Jeffery M. Wooldridge. Try to find a good price. It does not matter which edition of the textbook you purchase as they all cover the same material in the same order. This course follows the textbook closely. Reading the textbook will help you complete the homework assignments and prepare for exams. You do not need to purchase any data access or workbooks that sometimes come bundled with textbooks. You only need the textbook itself.

Prerequisites
Students are expected to understand the material covered in a statistics course including probability theory. Students are also expected to know how to use algebra and basic calculus. Taking econometrics without a knowledge of statistics and mathematics would put you at a real disadvantage in this course. If you need to do some review, I recommend working through the textbook appendices. Mathematics is reviewed in Appendix A, probability is reviewed in Appendix B, and statistics is reviewed in Appendix C.

Required Software
Completing problem sets and exams will require using **Stata**, a statistical software package commonly used by economists and analysts. You will use Stata to complete a series of econometrics exercises designed to provide experience with various tests and estimation procedures. Purdue students do not need to purchase a license. You can download a free copy of Stata/SE from Purdue to your personally-owned computer with an academic-year license (expires each year in May) from: communityhub.purdue.edu/storefront/product/stata_personal.

If you would rather purchase your own copy of Stata, take advantage of the student pricing program which will get you a large discount. The "small Stata" option is not sufficient for the class; you would need to either purchase Stata/IC or Stata/SE. If you have any difficulty installing Stata properly, please contact the computer center at it@purdue.edu.

Course Website
This course uses Purdue's Brightspace learning management system for course announcements, problem sets, discussion, exams, and to provide you with video lectures. I encourage you to post your course-related questions to the discussion board instead of emailing me. Rather than immediately answering questions on the discussion board, I wait to respond to allow other students the opportunity to respond first. The web address is https://purdue.brightspace.com.

Course Outline

This course is divided into 13 topics, each of which has an associated problem set. The deadlines for problem sets and exams are posted to the course website.

> Topic 1: Nature of Econometrics and Economic Data (Chapter 1)
> Topic 2: Simple Regression Model (Chapter 2)
> Topic 3: Multiple Regression Analysis (Chapter 3)
> Topic 4: Data Analysis Project (Chapter 19)
> Topic 5: OLS Inference (Chapter 4)
> Topic 6: OLS Asymptotics (Chapter 5)
> Topic 7: OLS Further Issues (Chapter 6)
> Topic 8: Binary Variables (Chapter 7)
> Topic 9: Heteroskedasticity (Chapter 8)
> Topic 10: Specification and Data Issues (Chapter 9)
> Topic 11: Instrumental Variables Estimation (Chapter 15)
> Topic 12: Basic Time Series Analysis (selections from Chapters 10, 11, 12, & 18)
> Topic 13: Panel Data Methods (selections from Chapters 13 & 14)

Problem Sets

Problem sets are a mix of true/false questions, multiple choice questions, and free response questions. Some questions will require you to do a mathematical derivation using the equation editor. Other questions will require you to analyze a dataset using Stata in order to provide a numerical answer. Working with others on the problem sets is encouraged, but each student must submit his or her own work. Do not copy/paste from other student's answers; you must type your own responses. To receive credit, assignments must be submitted by the deadline. Rather than allow exceptions, each student's lowest problem set score will be excluded in calculating the average problem set score.

Data Analysis Project

The data analysis project is an empirical analysis of economic data where you choose both the question and the data source. The analysis should use methods covered in this course. You will need to obtain, clean, and prepare the data for analysis. After conducting the econometric analysis, you will write a short report (5 pages or less) describing the data, the analysis, and the results. This written description of the research project must be completed by the deadline to receive credit.

Midterm Exam and Final Exam

There are two exams: a midterm and a final. The midterm covers material from Topics 1 – 8. The final exam is comprehensive and covers material from Topics 1 – 13 with extra emphasis on the material from Topics 9 – 13. Taking the exams require the use of Examity, an automated exam monitoring service. Examity will use your webcam to monitor your test-taking environment and will use screen capture to monitor your work. These are closed exams. You may not accept help from any other person nor may you offer help to your classmates. You may not use any notes, books, websites, or other materials while you are taking the exam. These are the rules:

- Take the exam in a private room where you are alone
- Clear your desk and the surrounding area
- Keep your computer connected to a power source
- Your computer can only have one monitor (no dual monitors)
- You must have a working webcam and microphone in order to take the exam
- Your webcam, speakers, and microphone must remain on throughout the exam
- Be prepared to show a photo ID
- No use of phone or physical calculator (on-screen calculator is fine)
- You cannot use headphones during the exam
- No leaving your seat; you must stay in view of the webcam during the exam
- No talking
- No internet searches
- Do not use the textbook or any other materials
- Use of one sheet of blank paper and a pen is allowed
- You will use Stata as part of the exam

I provide a "practice exam" that allows you to test out the exam monitoring software before the midterm exam. The practice exam contains no actual econometrics questions. It is your responsibility to ensure that you are able to take the exams online while using the monitoring service. Exam deadlines will not be extended.

Course Participation

This course will be more enjoyable and everyone will learn more if we have good participation on the discussion board in Brightspace. The discussion board keeps track of student posts and responses. Your course participation grade will be based on your activity asking and answering questions on the course discussion board and the quality of those posts. It can also be improved by participating in online office hours, though this is not required. Grading the quality of participation is subjective. I'm not a fan of subjective grading, but economists believe that incentives matter so I'm providing you with an incentive to participate in the online discussions.

Student Evaluation

Student evaluation will be based on the average score on your 12 best problem sets (lowest score problem set is dropped), the data analysis project score, the midterm exam score, the final exam score, and the course participation score. Each of these is a score out of 100. The total score is the weighted sum of these category scores with the following weights:

- Problem Sets (40%)
- Data Analysis Project (10%)
- Midterm Exam (15%)
- Final Exam (30%)
- Course Participation (5%)

Grading Scale

At the end of the semester, letter grades will be assigned based on the total score according to the following scale:

A	94 – 100
A-	88 – 94
B+	82 – 88
B	76 – 82
B-	70 – 76
C+	64 – 70
C	58 – 64
D	50 – 58
F	below 50

This grading scale usually results in about 40% of the class earning an A or A- and about 55% of the class earning a B+, B, or B-. Typically, about 5% of the class earns a C+ or below with very few D and F grades.

Academic Standing in the MS Economics Program

A master's student that earns a D or F grade in this course will be placed on academic probation and will be required to retake this course, earning a grade of C or better in order to graduate.

Incomplete

A grade of incomplete is given only if all three of the following conditions are satisfied: (1) the student's course work is interrupted by unavoidable absence or other causes beyond the student's control, (2) the work was passing at the time it was interrupted, (3) completing the work does not require the student to repeat the course

Course Evaluation

During the last two weeks of the semester, you will be provided with an opportunity to give feedback on this course and your instructor through an online course evaluation system. You will receive an official email from evaluation administrators with a link to the online evaluation site. Your participation is an important part of this course and your feedback will help me improve the course. Purdue administrators use student evaluations when making teaching assignments and when evaluating instructors. I encourage you to participate in evaluating this course.

Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of academic dishonesty. If I find that a student is cheating on an assignment (either receiving or giving help), the students involved will receive no credit for the assignment. If I find that a student is cheating on an exam (either receiving or giving help), the students involved will receive no credit for exam and the student will be reported to university administrators. Students are encouraged to alert university officials to potential academic dishonesty by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

Student Code of Honor

The purpose of the Purdue University academic community is to discover and disseminate truth. In order to achieve these goals, the university commits itself towards maintaining a culture of academic integrity and honesty. For this to be possible, self-discipline and a strong desire to benefit others must be present within each individual. Therefore, we students must follow the Regulations Governing Student Conduct of Purdue University out of a sense of mutual respect, rather than out of fear of the consequences of their violation. All Purdue students are asked to accept the Honor Pledge: "As a Boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue."

Online Behavior

All opinions and experiences, no matter how different or controversial, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique other's ideas, but not attack an individual. Please consider that sarcasm and humor can be misconstrued in online interactions and generate unintended conflict. Working as a community of learners, we can build a polite and respectful course ambience. Disruptive behavior on the discussion board or towards others in this class is not tolerated and is grounds for being removed from the course. Please follow these guidelines in this course:

- Do not dominate online discussions. Give other students the opportunity to contribute.
- Never use offensive language. Present ideas appropriately.
- Be cautious in using internet language (e.g., capitalizing all letters suggests shouting).
- Keep an "open-mind" and be willing to express your minority opinion.
- Think and edit before you post your comment/response to the discussion board.

Diversity & Inclusion Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. Any student who believes they have been discriminated against may visit www.purdue.edu/report-hate to submit a complaint to the Office of Institutional Equity. Information may be reported anonymously.

Accessibility and Accommodations

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

Use of Copyrighted Materials
The video lectures, problem sets, and exams that are presented in this course are protected by copyright law. Always assume the materials presented are protected by copyright unless the instructor has stated otherwise. Students enrolled in this course are permitted to take notes, which they may use for individual/group study or for other non-commercial purposes reasonably arising from enrollment in the course. Your course notes are considered to be "derivative works" of the instructor's materials and as such cannot be sold or bartered without the instructor's express written permission. Students are not permitted to post course videos to any other outlet (YouTube, Facebook, etc.). Students are not permitted to copy, reproduce, or post course videos, problem sets, exams, or any other course materials to any other website. Students enrolled in the course are the authors of the works they create in the learning environment (for example, comments posted on the discussion board). As authors, they own the copyright in their works subject only to the university's right to use those works for educational purposes. Students may not copy, reproduce or post to other websites any work in which they are not the sole or joint author or have not obtained the permission of the author(s).

Mental Health, Wellness, and Basic Needs
If you find yourself struggling to find a healthy life balance and experiencing stress, Purdue provides help. You can contact Counseling and Psychological Services (CAPS) at (765) 494-6995 for counseling services. You can contact Purdue Wellness Coaching for a one-on-one virtual coaching session focused on navigating through barriers and challenges. If you experience an unexpected financial crisis and need help to stay on track academically, contact Purdue's Critical Need Fund by calling (765) 494-1747.

In Case of Emergency
In the event of a major emergency or other disruption, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or teaching assistants via email. You are expected to read your @purdue.edu email on a frequent basis.