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St. Edward's University
The Bill Munday School of Business

Econ 4327: Econometrics
Spring 2021

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Instructor:	Chen Xu
Email:	cxu@stedwards.edu
Office Hours:	Virtual office hours TR 2:30 -3:30 p.m. CST on Zoom or by appointment
Class Times:	MW 02:00 - 03:15 p.m. CST
Final Exam Time:	Thursday, May 6th, 1:30 - 3:30 p.m. CST on Zoom

The Bill Munday School of Business Mission Statement

The Bill Munday School of Business delivers an experiential, values-based education anchored in the liberal arts and the Holy Cross traditions of learning and service. The School educates students to excel professionally in the dynamic 21st century business environment by emphasizing creative thinking, critical analysis, global collaboration, lifelong learning, adaptation to change, and ethical behavior. The School promotes relationships on our campus, with our global partners, and across the rich ecosystem of Austin, focusing on technology, creativity, social enterprise, and emerging trends.

The Bill Munday School of Business Policy on Ethics: Although topics in this class will be examined mainly from an economic way of thinking, the ethical components of these issues will be raised and discussed whenever relevant.

Course Description

This course is designed to help students learn the conceptual and statistical machinery that form the foundation of economic research. The course will also help students develop skills in using computer software to perform data analyses.

Student Learning Outcomes

By the end of the course, students should be able to do the following:

1. Demonstrate an understanding of the theoretical foundations of estimating and testing the basic regression model, employing tools from statistics (including calculus and matrix algebra).

2. Perform basic regression and testing procedures using the R programming language

3. Complete an empirical research project that includes the following elements

   - Formulate an econometric model.
   - Collect and prepare relevant data for use in estimating the model.
   - Use appropriate methods of estimation.
   - Test relevant behavioral hypotheses.
   - Understand and test the Gauss-Markov assumptions.
   - Analyze and interpret the estimated model.
   - Prepare a written report summarizing the research results.

For further detail on course content, see the course schedule at the end of this document.

Prerequisites

- Econ 2301 (Principles of Microeconomics) is required

- Econ 2302 (Principles of Macroeconomics) is required

- Busi 2305 (Business Statistics) is required

Textbook and other materials

Materials for the course will be assigned from the following sources:

1. The textbook for this course will be *Introductory Econometrics: A Modern Approach 7e*, by Jeffrey M. Wooldridge. (You may use older versions for reading purpose.)

2. *R for Data Science* (by Hadley Wickham and Garrett Grolemund), e-Book available for **free** here (paperback copy available from Amazon for $18.17)

3. *Using R for Introductory Econometrics* (by Florian Heiss), e-Book available for **free** here (paperback copy available from Amazon for $26.90)

4. *Econometrics in R* (by Grant V. Farnsworth), reference guide (PDF) available for **free** here

Course website

Class announcements and homework will be posted on the course website on Canvas: https://canvas.stedwards.edu. It is your responsibility to check the site regularly.

Grading policies

Your grade will be determined by the following criteria:

- Problem Sets (20%)

    - Numbers of problem sets will be assigned throughout the semester; lowest score will be dropped. Consist of proofs, derivations, and empirical exercises in R. You may work on these in groups but you must turn in an individual copy.

- Class Participation (15%)

    - Pop-quiz; in-class activities.

- Midterm Exam (20%)

- Final Exam (25%)

    - The final exam will account for 25% of the course grade. Students whose final exam score exceeds their midterm score will receive the final exam score for the midterm exam if the midterm score was lower. **Students who do not take the final exam will receive a zero for both the Midterm and the Final**.

- An original econometric research paper (20%); more details on separate document in Canvas

    - Topic and Data (due on the 4th week - February 10)
    - Initial R analysis file (due on the 8th week - March 8)
    - First Draft (due on the 12th week - April 5)
    - 10–15 minute in-class presentation of findings (Power Point Slides are required)
    - Final draft (due on May 2)

Grading scale

Both exams will be out of 100 points. At the end of the course, I will compute a final percentage grade based on component percentages of each grade category using the weights given above. I will then convert this final percentage grade into letter grades according to the following scale (where g indicates your final percentage grade):

$$
\begin{array}{rccl}
98\% \leq & g & \leq 100\% & \text{A+} \\
92\% \leq & g & \leq 97.99\% & \text{A} \\
90\% \leq & g & \leq 91.99\% & \text{A-} \\
88\% \leq & g & < 89.99\% & \text{B+} \\
82\% \leq & g & \leq 87.99\% & \text{B} \\
80\% \leq & g & \leq 81.99\% & \text{B-} \\
77\% \leq & g & < 79.99\% & \text{C+} \\
70\% \leq & g & < 76.99\% & \text{C} \\
60\% \leq & g & < 70\% & \text{D} \\
0\% \leq & g & < 60\% & \text{F} \\
\end{array}
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I reserve the right to scale upwards everyone's final percentage grades.

Drop/Withdrawal Policy

Discontinuing attendance or notifying an instructor of a status change does not constitute a drop or withdrawal. The student is responsible for initiating and completing the drop or withdrawal procedure by utilizing myHilltop. If the student fails to complete the process, s/he will receive the grade(s) assigned by the instructor(s) of record and be billed accordingly.

A student may add or drop courses (make schedule adjustments) anytime during the registration period. After this period, a student may only withdraw from courses. Consult the Registrar Dates & Deadlines and Course Schedules online for specific course begin, end, add, drop or withdrawal dates and other important deadlines:
https://www.stedwards.edu/academics/registrar/academic-calendar/dates-deadlines
A student may withdraw from a course under the following provisions:

1. Through the 12th class day (Official Headcount Day) of any semester (or the equivalent during short terms), without having the course recorded on the transcript.

2. After the 12th class day of the semester (or the equivalent during short terms), but before the end of the 10th week of the semester, with a grade of W recorded on the transcript. **If the withdrawal procedure is not followed to its conclusion, a grade of F will be entered on the transcript.**

3. After the first 10 weeks of a semester, four weeks of a six-week term, or eight weeks of a 12-week term, no student may withdraw from a course.

During the first 10 weeks of a semesters and the comparable period in short terms, an instructor has the option, but is not required, to request the Registrar to assign a grade of *WA* (*Withdrawal due to Absences*) to a student who has excessive absences from a class.

To reiterate: A student is not officially dropped from a class, except in the case of a WA, until the student completes the drop process, as published by the Office of the Registrar.
For more information, consult your Student Bulletin, found here:
https://www.stedwards.edu/policies/university-handbooks-guides-and-manuals.

Incomplete

A grade of I (Incomplete) may be given only in exceptional cases in which extenuating circumstances that occur in the last 10 days of the semester interfere with the completion of final course work. Work must be completed and the grade received in the Office of the Registrar by Oct. 1 for all summer-term courses, March 1 for fall semester courses and July 1 for spring semester courses, or a grade of F will be entered on the transcript.

University Policies

Academic Integrity and Ethical Components

St. Edward's University expects academic honesty from all members of the community, and it is our policy that academic integrity be fostered to the highest degree possible. The academic integrity policy will be strictly enforced in this class.

An academic community of integrity strives for excellence by creating a learning environment where high academic standards in terms of student performance, program integrity, course development and requirements are encouraged. This can only be realized if the community is aware of and adheres to clearly established values and goals where the end is personal and academic integrity. Our commitment to the values of academic integrity contributes to St. Edward's University's being a quality institution of higher learning and that adherence to the Mission Statement will continue to be fulfilled.

The ability to express ourselves articulately in both oral and written form requires ability for critical and creative thinking which necessitates a clear sense of academic integrity. Academic integrity is important because it involves values which can be grounded in both reason and faith. The core values of academic and personal integrity are:

1. Honesty: An academic community of integrity advances the quest for truth and knowledge by requiring intellectual and personal honesty in learning, teaching, research, and service.

2. Fairness: An academic community of integrity establishes clear standards, practices, and procedures and expects fairness in the interactions of students, faculty, and administrators.

3. Trust: An academic community of integrity fosters a climate of mutual trust, encourages the free exchange of ideas, and enables all to reach their highest potential.

4. Respect: An academic community of integrity recognizes the participatory nature of the learning process and honors and respects the work of others and the members of the learning community.

5. Responsibility: An academic community of integrity upholds personal accountability and depends upon action in the face of wrongdoing.

We achieve this not only through publication and proclamation of these values, but also by creating a learning environment where these values can be realized. St. Edward's University expects academic honesty from all members of the community, and it is our policy that academic integrity be fostered to the highest degree possible. Consequently, all work submitted for grading in a course must be created as a result of your own thought and effort. Representing work as your own when it is not a result of much thought and effort is a violation of our code of academic integrity. Whenever it is established that academic dishonesty has occurred, the course instructor shall impose a penalty upon the offending individual(s). It is recognized that some offenses are more egregious than others and that, therefore, a range of penalties should be available. Whenever possible, it would also be important to try to determine the intent of the offender, since the error could be a result of careless work rather than intent to deceive. The maximum penalty for a first offense is failure in the course, and if that penalty is imposed, the student does not have

the option of withdrawing from the course. In cases of mitigating circumstance, the instructor has the option of assigning a lesser penalty. After obtaining sufficient evidence that such dishonesty has occurred, the instructor should discuss the question with the student. Instructors who impose a penalty for serious academic dishonesty should report this penalty to the dean or director of the program in which the course is offered. The dean or director will report confirmed cases of dishonesty to the Associate VP for Academic Affairs, and a record of all offenses will be kept in the Office of the Associate VP for Academic Affairs. Offenses that resulted in failure in the course will then be reported to the Office of the Registrar.

The Associate VP for Academic Affairs will determine whether an earlier serious offense by the student has been recorded. A second serious offense merits an automatic appeal. Upon denial of this appeal, the Associate VP for Academic Affairs will dismiss the student from the university and notify the registrar and the dean or director.

A procedure for student appeal is already established and is outlined in detail in the Student Handbook, but it should be noted that, for appeals of decisions regarding academic dishonesty, the student must appeal to the dean of the school or program director within five (5) working days after being notified by the instructor.

For more information, visit: https://stedwards.app.box.com/v/academicbulletins.

Student Disability Services

Student Disability Services coordinates reasonable accommodations for students with documented disabilities (medical, learning or psychological). Any student who feels s/he may need an accommodation based on the impact of a disability should follow the university's accommodation procedure by contacting Student Disability Services (512-448-8561 or Moody Hall 155).

Title IX Mandatory Reporting

A Note on Sex/Gender Harassment, Discrimination & Misconduct

St. Edward's University is committed to fostering a safe, inclusive and productive learning environment. Title IX, state laws, and SEU policy prohibit discrimination on the basis of sex and gender identity. Consequently, sexual misconduct —including harassment, relationship violence, sexual assault, and stalking —is also prohibited at SEU.

The university encourages anyone impacted by or experiencing sexual misconduct to talk to someone about what happened, so they can get the support they need and SEU can respond appropriately.

But you should know that only some SEU employees can offer you confidentiality. I cannot.

If you wish to speak confidentially about an incident of sexual misconduct, please contact the Health & Counseling Center in Johnson Hall at 512-448-8538 to speak with a counselor or advocate.

Please know as a faculty member, I am a mandatory reporter and required by SEU, federal and state laws to report incidents of sexual misconduct that I "witness" or "receive information regarding the occurrence of " and thus cannot offer any confidentiality —even if you ask me to. I

must provide our Title IX coordinator with relevant details including the names of those involved in the incident or I will be terminated from employment and possibly prosecuted.

To make a formal report, you can contact the Dean of Students Office in Main Building, G 16, 512-448-8408, or go to https://www.stedwards.edu/campus-services/title-ix-and-preventing-discrimination/title-ix-students. Anonymous reporting is an option through the website. If you would like to make a police report, you can contact our University Police Department at 512-448-8444. The university will investigate reports of sexual misconduct and may need to override a request for confidentiality and pursue an alleged perpetrator in order to provide a safe campus for everyone.

If you have questions about university policies and procedures regarding sexual misconduct, please contact our Title IX Coordinator, Dr. Lisa Kirkpatrick, Vice President for Student Affairs, Main Building, G 16, 512-448-8425. You can also learn more about Title IX at St. Edward's University by visiting the website at https://www.stedwards.edu/campus-services/title-ix-and-preventing-discrimination.

Tentative Outline[1]

Chapters with * are optional chapters.

Appendixes A, B, C	Basic Mathematics and Statistics review
Ch1.	Introduction
Ch2.	The Simple Regression Model
Ch3.	Multiple Regression Analysis: Estimation
Ch4.	Multiple Regression Analysis: Inference
Ch5.*	Multiple Regression Analysis: OLS Asymptotics
Ch6.	Multiple Regression Analysis: Further Issues
Ch7.	Multiple Regression Analysis with Qualitative Information: Binary (or Dummy) Variables
Ch8.	Heteroskedasticity
Ch10.	Basic Regresion Analysis with Time Series Data
Ch11.*	Further Issues in Using OLS with Time Series Data
Ch12.*	Serial Correlation and Heteroskedasticity in Time Series Regressions
Ch13.	Pooling Cross Sections Across Time: Simple Panel Data Methods
Ch14.*	Advanced Panel Data Methods
Ch15.*	Instrumental Variables Estimation and Two Stage Least Squares

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[1]This is only an outline. We likely will not stick to this schedule exactly, but it should serve as a rough guide of what we will do over the semester. As it is only an outline, some material may be added or subtracted later in the course.

Course Schedule, Page 1

"W" stands for "Wooldridge"

Date	Material	Readings	Due
Wed Jan 20	Intro to the course		Installing R/RStudio
Mon Jan 25	Statistics review	W: Skim 1.1-1.4, Read App. C.1-C.3,C6a-C.6c	
Wed Jan 27	Intro to R and RStudio		
Mon Feb 1	Bivariate regression	W: 2.1-2.3	
Wed Feb 3	Bivariate regression	W: 2.4-2.5	
Mon Feb 8	Multiple regression	W: 3.1-3.2	
Wed Feb 10	Multiple regression	W: 3.3-3.4	HW1, **Project proposal**
Mon Feb 15	Multiple regression	W: 3.5, 7.1-7.6 (skip 7.4c)	
Wed Feb 17	Inference	W: 4.1-4.3	HW2
Mon Feb 22	Inference	W: 4.4-4.6	
Wed Feb 24	GMT violations: heteroskedasticity	W: 5.2a, 8.1-8.3	HW5; First Draft
Mon Mar 1	GMT violations: heteroskedasticity	8.4-8.5	
Wed Mar 3	GMT violations: serial correlation	10.1, 12.1-12.3	HW3
Mon Mar 8	GMT violations: serial correlation	12.4-12.6	
Wed Mar 10	No class		**Initial R Analysis**
Mon Mar 15	Midterm review	Midterm study guide (Canvas)	
Wed Mar 17	Midterm (on Zoom)		
Mon Mar 22	GMT violations: $E[u|X] \neq 0$	W: 9.1-9.6	
Wed Mar 24	IV	W: 15.1- 15.2	
Mon Mar 29	IV	W: 15.3	
Wed Mar 31	IV	W: 15.4-15.5	HW4

Course Schedule, Page 2

Date	Material	Readings	Due
Mon Apr 5	Time series	W: 11.1-11.3	**First draft**
Wed Apr 7	Time series forecasting	W: 18.5	
Mon Apr 12	Panel: First difference, fixed effect	W: 13.1, 13.3, 14.1	
Wed Apr 14	Panel: Random Effects	W: 14.2	HW5
Mon Apr 19	Panel: Differences-in-differences	W: 13.2, 13.4	
Wed Apr 21	Panel: Differences-in-differences		HW6
Mon Apr 26	Student Presentations		
Wed Apr 28	Exam review	Final study guide (Canvas)	
Thu May 6	Final exam (on Zoom)		**Final draft due on May 2**