

Virginia Tech
Department of Economics
Fall 2023

ECON 3254: Analysis of Economic Data

Instructor: Brianna Felegi, Ph.D. (bfelegi@vt.edu)

Graduate Teaching Assistant: Reza Tavakoli (rtavakoli@vt.edu)

Class Time: Tuesdays and Thursdays, 11:00 am - 12:15 pm (Section 84477)
2:00 pm - 3:15 pm (Section 84476)

Class Location: PAM 3010 for Section 84477, PAM 2001 for Section 84476

Instructor Office Hour Times: Tuesdays and Thursdays in 3122 Pamplin Hall

9:00 am – 10:00 am; 4:00 pm – 5:00 pm

Or By Appointment

TA Office Hour Times: Wednesdays in 3117 Pamplin Hall

10:00 am – 11:00am

Course Description and Objectives

This course intends to expose you to the statistical techniques that economists use for estimating, testing, and forecasting economic relationships. The emphasis is on understanding the techniques involved and what they mean in terms of the economic problem being studied. Successful completion of this course should allow you to (1) understand empirical literature in economics and (2) be prepared to start doing independent research using economic data, particularly in upper-level classes. This course will emphasize economic applications over statistical theory.

Through this course, you will have gained the skills necessary to be a thoughtful consumer of social science research. You will be able read and understand the output that is generated when you estimate a model. You will be able to identify and analyze the basic problems that can arise when using ordinary least squares estimation and you will be able to implement the appropriate techniques to overcome these problems. Students often find the course to be rigorous and demanding. We will move quickly and cover a large amount of material. I advise you to prepare for class and keep up with the material, as the course does not lend itself to memorization or all-night cram sessions.

Prerequisites

BIT 2405 (MIN grade of P) or MSCI 2405 (MIN grade of P), BIT 2406 (MIN grade of P) or MSCI 2406 (MIN grade of P) or STAT 3005 (MIN grade of P) or STAT 4604 (MIN grade of P) or STAT 4705 (MIN grade of P) or STAT 4714 (MIN grade of P)

Course Materials

1. “Mastering ‘Metrics: The Path from Cause to Effect”, 2015, Angrist and Pischke
2. Stata, A six-month student copy of the I/C version is sufficient ([link](#))
3. “Using Econometrics: A Practical Guide”, 7th edition, by A.H. Studenmund (Optional)

Statistical Software

The class will use the Stata statistical software package. Stata is a fast and versatile program that was written by economists, so it is more intuitive for people in our field. Stata is the program of choice for applied micro economists.

You can purchase a six-month student copy of Stata for \$48 at the following link:

<https://www.stata.com/order/new/edu/profplus/student-pricing/>

Stata a required resource. This software will not run on Chromebooks. The details of computer requirements for Stata can be found here:

<https://www.stata.com/products/compatible-operating-systems/>

To introduce you to Stata, I will host an optional, but HIGHLY recommended, two-hour tutorial session on August 29th between 6:00-8:00pm. I will provide a room location the first week of class.

I have programmed in Stata for years so if you have any question, please let me know. One note – in order to help you with your programming, I need to see the code. Therefore, copy the code you are working and email me the text. Too many people come to my office and say “I typed what was in the handout and it did not work” then don’t show me their code. I need to see what you are doing before I can help.

Requirements (and grading weight)

A. Homework Assignments (20%)

Homework will involve solving problems and answering questions related to material we covered in class, as well as performing econometric analysis in Stata.

You may use the textbook, personal notes, or other reference material to do the homework. You may and are encouraged to work with your classmates. However, everyone must turn in their own work, perform their own Stata analysis, and write the answers in their own words. If homework is identical to a classmates’, you may not receive credit for the answer.

Assignments and due dates will be posted in Canvas. Homework is to be turned in by the start of class on the due date. You can turn in a physical copy to me in class or upload a submission in Canvas. For Stata portions of the homework, you must submit your code and output. 20 points will be taken off for each day past the due date that the homework is turned in.

In total, there are 6 problem sets. Only 4 are graded. You may replace your lowest problem set grades with your grade from practice problem sets. I highly recommend you complete the practice problem sets as they will contain material on your exams.

B. Presentation and Research Report (20%)

At the end of the second week of class, you will be put into groups for a research project. The project will require your group to develop an economic research question, find data to answer the question and perform the statistical analysis necessary to answer the question.

There will be four components of the project that will be graded.

- Project Proposal (20 points)

On Tuesday October 3rd, the group will share with the class the specific question to be answered, data to be used and which variables will be used in the analysis.

- Presentation (30 points)

The week after Thanksgiving, November 28th and 30th, each group will jointly present their findings from their research project during a 15-minute presentation. You are required to present background information, your research question, how you answer the question (the regression model), the data you used, your results and their implications.

- Final Report (30 points)

Each group is required to hand in a 4–7-page report, due December 5th, that provides background information, your research question, discussion of your model, data used, presentation of your results, their implications as well as their limitations.

- Participation (20 points)

Each group member will fill out a report that grades each members participation. Each member will receive the average grade assigned by their group members.

Group assignment of presentation day and grading rubric is provided during the semester.

C. Midterms (15% each; Total 30%)

There will be two midterm exams conducted throughout the semester that are in class and are closed book. For midterms, you are allowed to bring in a single-sided 8.5 x 11-inch sheet of paper with anything on it legible to your naked eye. Both midterms will take place during

the regularly scheduled class time in our usual classroom. The first midterm will be Thursday October 5th, and the second midterm will be Thursday November 9th. There are no makeups for midterms, unless you have a documented emergency (e.g. serious injury, death of family member)

D. Final Exam (30%)

The final exam will take place on December 9 either between 1:05 - 3:05 pm (Section 84477) or between 7:45 - 9:45 am (Section 84476) in our usual classroom unless you are informed otherwise. For the final, you are allowed to bring in an 8.5 x 11-inch sheet of paper with anything on it legible to your naked eye. You **MUST** take the exam at the scheduled date and time for your assigned section. If you happen to have too many exams in a single day, i.e. 3 exams in 24 hours, and wish to reschedule the final exam, you must contact the appropriate VT channel (presumably the Office of the Registrar) and obtain permission from the Dean's office (note: there is a deadline for this). If you miss the final exam and do not have an excuse from the Dean, you will receive a score of 0% on your final. There will be no makeup for the final exam, unless you have a documented emergency (e.g. serious injury, death of a family member).

E. Class Participation Bonus (Up to 5% of Grading Score)

You can earn bonus points for participation in class (answering questions, asking clarifying questions, going to office hours, pointing out mistakes on board, providing feedback to peers during group presentations). About once a week, I will provide the class with some news media that is relevant to the topics of discussion. You can earn participation points by adding to the conversation about the piece and relating it to what you have learned in class.

In summary, final grades for the course will be based on the following:

Homework Assignments	20%
Presentation and Research Report	20%
Midterms	30%
Final Exam	30%
Class Participation Bonus	Up to 5% of grading score

Letter grades will be assigned as follows:

A	93-100
A-	90-92.99
B+	87-89.99
B	83-86.99
B-	80-82.99
C+	77-79.99

C	73-76.99
C-	70-72.99
D	60-69.99
F	0-59.99

Grading Questions or Disputes

I want you to understand how you are evaluated in this class. If you have any questions about your grade or feedback on course work, please email me to schedule a time to meet. I kindly ask that you wait at least 24 hours after work has been returned before requesting an appointment. This is to give you time to more thoroughly consider questions you have about your work.

Canvas

Our website within Canvas (<https://canvas.vt.edu/>) will have the slides class, assignment information and more. Please check the website regularly for class updates.

Academic Honesty

One of the goals of this course is to prepare you to do well in advanced economics courses, so it is essential that you develop a solid understanding of the material. To that end, while collaboration on problem sets is encouraged in this course, copying is not. Students are expected to understand and abide by the University's honor code (<https://honorsystem.vt.edu/>).

Undergraduate Academic Integrity Statement

The Undergraduate Honor Code pledge that each member of the university community agrees to abide by states:

“As a Hokie, I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do.”

Students enrolled in this course are responsible for abiding by the Honor Code. A student who has doubts about how the Honor Code applies to any assignment is responsible for obtaining specific guidance from the course instructor before submitting the assignment for evaluation. Students are strongly discouraged from misusing sites such as Chegg and CourseHero, as well as misusing ChatGPT and other Generative Artificial Intelligence. Students are strongly encouraged to consult their faculty members regarding the use of such outside materials as the misuse of these sources may constitute a violation of the Honor Code. Ignorance of the rules does not exclude any member of the University community from the requirements and expectations of the Honor Code.

Academic Accommodations

Virginia Tech welcomes students with disabilities into the University's educational programs. The University promotes efforts to provide equal access and a culture of inclusion without altering the essential elements of coursework. If you anticipate or experience academic barriers that may be due to disability, including but not limited to ADHD, chronic or temporary medical conditions, deaf or hard of hearing, learning disability, mental health, or vision impairment, please contact the Services for Students with Disabilities (SSD) office (540-231-3788, ssd@vt.edu, or visit ssd.vt.edu). If you have an SSD accommodation letter, please meet with me privately during office hours as early in the semester as possible to deliver your letter and discuss your accommodations. You must give me reasonable notice to implement your accommodations, which is generally 5 business days and 10 business days for final exams.

If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course.

Basic Needs Statement

For any student who has difficulty affording groceries, accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and if you believe this may affect your performance in this course, you are urged to contact the Dean of Students office for support at 540-231-3787 or complete an [interest form](#) to participate in The Market at Virginia Tech.

The Dean of Students, through The Market at Virginia Tech, offers food options and other resources. There is also a [Student Emergency Fund program](#). If you are comfortable in doing so, please notify me or your departmental advisor of your situation. This will enable them to provide any resources they have access to.

Lauren's Promise I will listen and believe you if someone is threatening or harassing you.

Lauren McCluskey, a 21-year-old student at the University of Utah and the daughter of economist Jill McCluskey, was murdered on October 22nd, 2018, by a man she briefly dated. I am committed to doing what I can to make sure this does not happen again.

If you are in immediate danger, call 911. If you are experiencing sexual assault, domestic violence, stalking, or harassment you can report it to me. You should be aware that I am a mandatory reporter, which means that I am required to report these instances to the university's Title IX Coordinator or Deputy Title IX Coordinator to investigate. **You can also learn about your options (both on and off-campus as well as confidential or not) at <https://oea.vt.edu/title-ix-vawa.html>.** If you need support for your mental or emotional health for any reason, you can talk to me. You can also find helpful resources at <https://ucc.vt.edu/>.

Tentative Course Outline (Subject to Change)

Dates	Lecture Topics	Assignments and Readings
Week I: Aug. 22 nd & Aug.24 th	Introduction to Course Probability and Statistics Review	A&P Appendix Mastering Inference
Week II: Aug. 29 ^h & Aug. 31 st	Randomized Control Trials Motivating Regression	Optional Tutorial Aug. 29 th – 6:00 to 8:00pm A&P Chap. 1 Randomized Trials A&P Chap 2. Regression
Week III: Sep. 5 th & Sep 7 th	Overview of Regression Analysis	Sep. 7 th – Problem Set #1 Due A&P Appendix Regression Theory
Week IV: Sep. 12 th & Sep 14 th	Regression Analysis Hypothesis Testing	
Week V: Sep. 19 th & Sep. 21 st	Statistical Inference Choosing Independent Variables	Sep. 21 st – Problem Set #2 Due
Week VI: Sep. 26 th & Sep. 28 th	Choosing Functional Form Multicollinearity Serial Correlation	
Week VII: Oct. 3 rd & Oct. 5 th	Heteroskedasticity Simultaneous Equations Midterm 1	Oct. 3 rd – Project Proposal Due Oct. 5 th – Midterm 1
Week VIII: Oct. 10 th & Oct. 12 th	Instrumental Variables	A&P Chap 3. Instrumental Variables
Week IX: Oct. 17 th & Oct. 19 th	Instrumental Variables	Oct. 19 th – Problem Set #3 Due
Week X: Oct. 24 th & 26 th	Regression Discontinuity	A&P Chap 4. RD Designs
Week XI: Oct. 31 st & Nov. 2 nd	Regression Discontinuity	Nov. 2 nd – Problem Set #4 Due A&P Chap 4. RD Designs

Week XII: Nov. 7 th & Nov. 9 th	Difference-in-Differences Midterm 2	Nov. 9 th – Midterm 2 A&P Chap 5. Differences-in-Differences
Week XIII: Nov. 14 th & Nov. 16 th	Difference-in-Differences	
Week XIV: Nov. 21 st & Nov. 23 rd	No Class – Thanksgiving Break	
Week XV: Nov. 28 th & Nov. 30 th	Research Project Presentations	Nov. 28 th – Group Presentations Due
Week XVI: December 5 th	Final Exam Review	Dec. 5 th – Final Report Due