

COURSE SYLLABUS
Master of Professional Studies Program in Applied Economics
University of Maryland Department of Economics
ECON 645, Empirical Analysis III, Fall 2018

Lecturer: Marquise J. McGraw, Ph.D.

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Office Hours: Tuesdays 5:45-6:15 pm in Morrill 1102C and by appointment.

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Office Hours: Mon, Tues 5:00-6:30

Course Meeting Location: Tydings 2102

Course Date and Time: Tuesdays, 6:30 pm – 9:15 pm, August 28th – December 18th

Notes: (1) There will be a 15-minute break at some point between 7:30 and 8:15.

(2) No class meeting on December 11th (Reading Day)

*(3) Class is **NOT** cancelled on November 20th (Tuesday before Thanksgiving).*

(4) While the Final Exam and last course meeting is scheduled for December 4th, please do not plan to leave town prior to December 18th. If unforeseen circumstances arise requiring that a regular Tuesday class meeting be rescheduled, the Final Exam may take place on Dec. 18th.

Course Description: This is the third in the three-course sequence “Empirical Analysis”: ECON 643, ECON 644, and ECON 645. The course introduces students to econometric methods, including hands-on work implementing those methods using STATA software. In particular, we will focus on the following topics: advanced panel data methods, methods of causal inference (including but not limited to instrumental variables, matching, difference-in-differences and regression discontinuity), limited dependent variable models, and sample selection correction models.

Course Objectives:

At the end of this course, you will be able to apply cutting-edge and widely used econometric techniques to data and research questions. You will also have sufficient working knowledge of these statistical techniques to read academic empirical papers utilizing these techniques.

Our program has 7 general learning outcomes for students:

1. Ability to understand, evaluate and analyze economic data
2. Ability to understand and interpret statistical evidence from economic data
3. Ability to apply empirical evidence to assessing economic arguments
4. Ability to apply macroeconomic theories to policy discussions
5. Ability to apply microeconomic theories to policy discussions
6. Ability to communicate economic ideas to a broader audience
7. Ability to evaluate the effectiveness of policy programs using sound economic techniques

The learning outcomes that pertain to this course are: 1, 2, 3, and 6

Required Course Materials:

- 1) *Introduction to Econometrics* by James H. Stock and Mark W. Watson, 3rd Edition Updated Version.
- 2) *Mastering Metrics: The Path from Cause to Effect* by Joshua D. Angrist and Jorn-Steffen Pischke, 1st Edition (2015).
- 3) *Data Management Using Stata: A Practical Handbook* (Stata Press) by Michael N. Mitchell, 1st Edition (2010).
- 4) STATA 14 or 15 software (and associated on-line manuals). STATA IC is sufficient.

Other Optional Materials:

I find Cameron and Trivedi's *Microeconometrics Using STATA: Revised Edition* to be helpful in providing additional examples of what STATA can do (and how to implement those), but you are not required to purchase it. Relevant excerpts used for this course will be provided via ELMS. Angrist and Pischke's other famous text, *Mostly Harmless Econometrics*, is also a nice text to have on your bookshelf. (You may be able to locate PDF draft versions freely available online that will be sufficient for our purposes.)

Any additional materials, including any academic papers of interest to us, will be provided online via ELMS. Students may be asked to locate supplemental material via UMD library resources as necessary.

Grading: 25% problem sets, 25% midterm, 40% final [cumulative] exam, 10% group presentation. Each exam will be graded out of 100 points, and multiplied by 0.25 (midterm) or 0.4 (final) to yield your "grade points" for those items. Each problem set will be graded out of 100 points. Of the five problem sets, only your best four scores will count for final grade computation purposes. These will be averaged, and then this will be multiplied by 0.25 to yield your final problem set grade. Class presentation grades will be out of 10 points, based on a rubric that I will provide to you. After summing the grade points, letter grades for the course will be assigned as follows: | 93-100: A | 90-92: A- | 80-89: B+ | 70-79: B | 60-69: B- | 50-59: C+ | 40-49: C | 30-39: C- | 20-29: D+ | 10-19: D | 0-9: F. The grade of A+ is assigned rarely and solely at the discretion of the instructor for exemplary performance in the course.

Problem Sets: There will be five problem sets that will be graded by the course TA. Homework will be assigned either before or shortly after the Tuesday evening lecture, and will be due strictly before the start of the following Tuesday's lecture (at 6:20 pm), so late work is unacceptable. Problem set questions are meant to be challenging, and are designed to help you prepare for the in-class exams. In most cases, problem sets will span 2-3 weeks – see the schedule. In rare cases, I may choose to amend or add questions added after the lecture(s) in the middle, but I will try to keep this to a minimum. You need to make sure that you set aside adequate time for each problem set – I estimate you should spend 6-10 hours on each! They must be submitted electronically via ELMS. When they require the use of Stata, submit both log files and do files in addition to the written answers to questions. I will go over my expectations in class regarding how problem set work is to be presented. 10 points will be deducted from each assignment if you do not follow my instructions and/or if we have to work too hard to figure out your work.

Generally, your problem sets should be typed. However, derivations and quick, descriptive graphs, if necessary and applicable, may be done by hand. If you do this, you should SCAN or PHOTOGRAPH your handwritten work and copy and paste into your main Word document to be uploaded electronically into ELMS. Please make sure that those parts of your assignment are legible, as illegible assignments will receive zero credit. You may work on problem sets in small groups, but each student must ultimately do all the questions themselves, and submit his or her own work, in his or her own words. Please note, in a footnote, the names of any students that you consulted with while working on the assignment. **NO LATE PROBLEM SETS WILL BE ACCEPTED. NO HARD COPY PROBLEM SETS WILL BE ACCEPTED.**

Paper Presentations: You will be assigned to a team of 2 (perhaps 3 if enrollment warrants, though given the current class size, I expect 8 teams of two.). Each team will be assigned a recent academic research paper using one or more of the topics covered in the course. Your job is to create a 15 minute presentation describing the paper, focusing the bulk of the time explaining what econometric techniques were used in their “main” regression model specifications, and critiquing the technique used based on what we’ve covered in the course to that point. (Note: SW Ch. 9 seems especially pertinent to this assignment.) A detailed grading rubric will be distributed and discussed during the second course meeting. You will be required to submit a first draft of the presentation to me no later than 8PM the Thursday evening preceding your presentation date. I will write back with feedback which should be incorporated into the final presentation generally by that Saturday evening. Presentations will be scattered throughout the course; please see the detailed schedule for more information on the dates. If you know you have to miss a class on a given Tuesday evening, please do not sign up for that evening’s presentation!

Tentative Presentation Dates and Primary Topics Covered. There will be 1-2 papers covered during each of these sessions on the pertinent topic.

Date of Presentation	Topic
October 2	Matching (1 paper), Panel Data (1 paper)
October 23	Instrumental Variables (2 papers)
November 6	Diff in Diff (1 paper), Event Study (1 paper)
November 13	Regression Discontinuity (1 paper), Synthetic Control (1 paper) [possible 9 th paper if enrollment warrants]

Deadlines: All assignments are to be submitted electronically on ELMS and are due at the beginning of class Tuesday, by 6:20pm. Since answers are posted at the beginning of class, late submissions are not acceptable. Assignments cannot be rescheduled except in exceptional and documented circumstances; see “University of Maryland Policies” below. The same applies to exams.

Course Meeting Structure: In general, the first half of the course meeting will be spent introducing or reviewing concepts in a lecture format, and the second half will be spent on Stata tutorials and student presentations. Thus, you must bring your laptop, with STATA installed, to all course meetings. Exams will also contain empirical components requiring you to use your laptop.

Topics Covered, Reading, Problem Sets and Dates:

Date	Lecture Topic	Stata Topic	'Metrics Reading (SW = Stock and Watson, AP = Angrist and Pischke)	STATA Reading (M=Mitchell, CT= Cameron and Trivedi (Provided))	Problem Set
August 28	Review of Multiple Regression Principles	Data management (loading/cleaning data, simple regressions)	SW Ch. 13.1 – 13.2, Review Ch 6, 7, 8, 9; AP Ch. 1, 2	M Ch.3 (All);	PS1 out
September 4	Limited Dependent Variable Models – Logit, Probit; Marginal Effects	Creating variables; Setting up and running nonlinear models; mfx/margins command; Discuss class presentations	SW Ch. 11, AP Ch. 1, 2	M Ch 5 (5.1 – 5.5); CT 14.1 – 14.5 (Logit/Probit)	
September 11	Matching Estimators (Propensity Score, Nearest Neighbor)	Data management; Variable creation, egen; In-class lab on STAR	Gelman Ch.10 10.1-10.3 (posted on ELMS)	M Ch 5 (5.6-5.12); SW 13.3 (STAR experiment)	
September 18	Panel Data and Fixed Effects I	Appending and Merging Datasets; In-class lab on STAR	SW Ch. 10	M Ch.6 (6.1 – 6.6)	PS1 due, PS2 out
September 25	Panel Data and Fixed Effects II	Reshaping data; Panel Data routines, Fixed effects modeling	SW Ch. 10	CT 8.1 – 8.5, 8.11, M Ch.8 (reshaping)	Graded PS1 returned
October 2*	Instrumental Variables Regression I	Use of ivregress and ivreg2 command, how to interpret output	SW Ch. 12, 13.4, 13.5, AP Ch.3	CT 6.3 and 6.4	PS2 due, PS3 out
October 9	Instrumental Variables Regression II; Review for Midterm	More practice running/interpreting IV model output	SW Ch. 12, 13.4 - 13.7, AP Ch.3	CT 6.3 and 6.4	Graded PS2 returned

Date	Lecture Topic	Stata Topic	'Metrics Reading (SW = Stock and Watson, AP = Angrist and Pischke)	STATA Reading (M=Mitchell, CT= Cameron and Trivedi (Provided))	Problem Set
October 16	Midterm Exam (90 min); IV Part III	IV estimation exercise, cont'd.	N/A	N/A	
October 23*	Diff in Diff I: Standard model, ext. to triple differences	Interaction variables, STATA operators and diff in diff	SW 13.4 – 13.7, AP Ch. 5	N/A	PS3 due, PS4 out, Midterm Exams returned
October 30	Diff in Diff II: Event Study; Synthetic Control Case Method	Working with code to implement event-study and synthetic controls in STATA	Jacobson, Lalonde and Sullivan (1993) - Event Study; Abadie, Diamond and Hainmueller (2010) - SC [papers will be posted on ELMS]		
November 6*	Regression Discontinuity	Using rdrobust to implement RD	SW 13.4 – 13.7, AP Ch. 4	N/A	Graded PS3 Returned
November 13*	Time Series I -AR and ADL models	N/A	SW Ch. 14.1 – 14.5		PS4 due, PS5 out
November 20	Time Series II – Trends, Breaks, Nonstationarity, Dynamic Causal Estimators	Time Series Estimation Self-Guided Tutorial; Working with code for Dynamic Causal Estimator	SW Ch. 14.6. 14.7, 15.1, 15.2, 15.3, 15.6	O.R-T tutorial on TS in STATA, CT 9.4.1 - 9.4.4	Graded PS4 returned
November 27	Wrap-up of Regression Methods (and Course) through MM Research Talk; Course Review	N/A	N/A (Review/Q&A Session for Exam)	N/A	PS5 due
December 4	Final Exam	N/A	N/A	N/A	Graded PS5 returned
December 11	No class: Reading Day	N/A	N/A	N/A	
December 18**		Final Exam Make-Up (<i>only if one of the earlier course meetings must be canceled due to unforeseen circumstances</i>)			

* Student Presentations will take place this evening ** Class meeting held only if necessary because of earlier course meeting cancellation

University of Maryland Policies

Course Website: Copies of the course syllabus, your grades, and other relevant links and documents will be posted on the course's ELMS/Canvas website. You can access the site via www.elms.umd.edu. You will need to use your University of Maryland "directory ID" and password.

Email: Email is the primary means of communication outside the classroom, and I will use it to inform you of important announcements. Students are responsible for updating their current email address via <http://www.testudo.umd.edu/apps/saddr/> AND for paying attention to messages I send to the class via ELMS. Failure to check email, errors in forwarding email, and returned email due to "mailbox full" or "user unknown" will not excuse a student from missing announcements or deadlines. I will do my best to respond to email within 36 hours.

Work Load: Mastering the material covered in this course requires a significant amount of work outside of class. Students should expect to spend more time outside of class than in class – typically at least twice as much time.

Academic Integrity: The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards applicable to all undergraduate and graduate students, and you are responsible for upholding these standards as you complete assignments and take exams in this course. Please make yourself aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information see www.studenthonorcouncil.umd.edu

Student Conduct: Students are expected to treat each other with respect. Disruptive behavior of any kind will not be tolerated. Students who are unable to show civility to one another or myself will be referred to the Office of Student Conduct. You are expected to adhere to the Code of Student Conduct.

Excused Absences: The University of Maryland's policy on excused absences is posted here: <http://www.president.umd.edu/administration/policies/section-v-student-affairs/v-100g>

Please note:

If you miss any class meetings for any reason, you are still responsible for all material covered during the meeting you missed. It is your responsibility – not the instructor's – to make sure you catch up on the missed material. Instructors routinely facilitate things by posting lecture notes, etc.

If you need to miss an exam or other graded course requirement because of illness, injury, or some other emergency: Follow doctor's orders and get documentation. Get in touch with the instructor as soon as you're able – preferably prior to missing the exam or deadline. Communicate with the instructor to make up the course requirement as soon as possible. You are entitled to recover before you make up the course requirement, but you are not entitled to extra days to study beyond the time the doctor's note says you're incapacitated. If you are incapacitated for more than a week or so beyond the end of the term, your grade in the course will be an "Incomplete". In such cases you must negotiate a plan with your instructor for completing the course requirements. Once you make up the course requirement the instructor will change your "I" to the appropriate letter grade.

School Closings and Delays: Information regarding official University closing and delays can be found on the campus website and the snow phone line: (301) 405-SNOW (405-7669) The program director will also announce cancellation information to the program as an announcement on the program's ELMS/Canvas site. This will generally be done by 1:00 p.m. on days when weather or other factors are an issue. If classes need to be cancelled during the semester, it may be necessary to move the final exam back a week so missed classes can be made up.

Students with Disabilities: The University of Maryland does not discriminate based on differences in age, race, ethnicity, sex, religion, disability, sexual orientation, class, political affiliation, and national origin. Reasonable accommodations will be made to students with documented disabilities. I will make every effort to accommodate students who are registered with the Disability Support Services (DSS) Office and who provide me with a University of Maryland DSS Accommodation form.

Academic Progress: The graduate school requires that students maintain a GPA of at least 3.0. Students whose cumulative GPA falls below 3.0 will be placed on academic probation by the graduate school. Students on academic probation must ask the program's director to petition the graduate school if they want to remain in the program. The petition must include a plan for getting the student's GPA up to at least 3.0. Students who do not live up to their plan can be forced to leave the program without having earned the degree. Note: a grade of "B" corresponds to a GPA of 3.0. A grade of "B-" corresponds to a GPA of 2.7.

Access to Morrill Hall and Morrill 1102: Morrill Hall is locked every day from 7:00 p.m. - 7:00 a.m. Your university ID gives you swipe access to the back door of the building.

Laptop Computer Requirement: Completing some of this course's requirements will require a laptop computer (not a notebook or a tablet!) with at least 1 GB of RAM and at least 5 GB of free space available on the hard-drive. We recommend laptops with at least a 15-inch screen. Screens smaller than 13 inches are probably not practical.

Purchasing Stata: Students in our program must purchase Stata. Stata offers different "flavors" and different lengths of licensing. Price varies according to these two factors. We do not recommend Small Stata since it is too limited for the coursework in our program. Stata/IC is the least expensive and sufficient version for your coursework. With a single-user license, you can install Stata on up to three computers. Description of all the flavors are given here:

<http://www.stata.com/products/which-stata-is-right-for-me/>

You can obtain Stata at discounted rates through the Campus GradPlan, in which University of Maryland, College Park is a participating institution. To benefit from the discounted prices, click on the link below and pick the Stata version you would like to buy.

(Note: Disregard the warning at the top which states that you must be a faculty or staff member. That is not correct.)

<http://www.stata.com/order/new/edu/gradplans/campus-gradplan/>

Through the Campus GradPlan you can buy either an annual (\$125 for Stata/IC) or a perpetual license (\$225 for Stata/IC). The perpetual license does not expire and is the most cost effective option assuming that you will stay in the program for at least 15 months. There are also upgrade

discounts provided to perpetual license holders. During the checkout process you will be asked to verify your “@umd.edu” email address.

If you wish to buy a 6-month license (\$75 for Stata/IC), you need to order it as a regular student using the following link:

<http://www.stata.com/order/new/edu/gradplans/student-pricing/>

During the checkout process you will be asked to upload a copy of your student ID or another document as a proof of your enrollment.