Course information

Meeting time: Tuesdays, 6:30pm - 9:15pm
Location: TYD 2102

Instructor                      Teaching assistant

Name   : Aaditya Dar              Name     : Luying Yang
Email   : aaditya@umd.edu          Email     : yangly@umd.edu
Office  : Morrill Hall 1106C      Office    : Zoom
Office hours: Tue, 5:30-6:15 PM; Wed, 2-3 PM Office hours: Sat, 10 AM to 10:45 AM
Office hours scheduler

Course description

Objectives: ECON 643 is a ‘first course’ in empirical research that introduces students to basic principles of statistical inference, data analysis and visualization to provide a foundation for quantitative analysis. The objective of the course is threefold: (a) familiarize students with key statistical ideas and mathematical tools (using practical examples rather than theory) for students who have not taken an introductory statistics for economics within the past year, or simply serve as a refresher for those who have; (b) provide a bare minimum knowledge to understand, at a high-level, academic research papers published in leading economics journals; and (c) initiate students into programming in Stata (used for data analysis and visualization) and LaTeX (used for typesetting technical papers). ECON 643 will serve as preparation for the econometrics sequence (ECON 644 and ECON 645) and a cornerstone of the MS program in applied economics.

Prerequisites: Admission to the Master of Science Program in Applied Economics. The course does not require any background in programming but basic computer literacy is assumed.
Course material: Since this course covers concepts from an introductory statistics course along with Stata and LaTeX exercises, there is no required textbook for this course. Lecture notes/slides will be self-contained and sufficient for the course. Should students need to consult a book, useful references are as follows:


Finally, students will be given ‘hands-on’ training with Stata, a statistical software that is commonly used by economists. Students should install Stata on their laptops and bring their laptops to class. A student copy of Stata may be ordered online from:

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

Learning outcomes

The MS Program in Applied Economics has 7 general learning outcomes for students:

1. [x] Ability to understand, evaluate and analyze economic data
2. [x] Ability to understand and interpret statistical evidence from economic data
3. [x] 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. [x] Ability to communicate economic ideas to a broader audience
7. [x] Ability to evaluate the effectiveness of policy programs using sound economic techniques

The learning outcomes that pertain to this course are: 1, 2, 3, 6, and 7.

Students will master basic statistics/math at a level of rigor befitting a professional master of science degree program in applied economics. Students will be able to perform basic statistical analysis using Stata. Students will be able to interpret basic statistical results correctly and communicate them professionally in English. Upon completion of the course, students will be prepared to study applied econometrics in ECON 644.

Average minimum amount of independent, out-of-class, learning expected per week

Since a majority of the students in the program have been working before joining the MS program, a ‘first course’ in statistics and empirical analysis can end up being challenging. Let there be no doubt
that this is not an easy course, even if the material looks familiar. Students are expected to put in at least 5-10 hours each week outside the classroom, depending on their background skills and training. Regularly working through the problem sets is a good way to keep up with the material. In addition to graded assignments, students will be assigned regular homework over the course of the semester. Although these homework assignments will not be graded, detailed answer sheets shall be provided. If you have trouble with homework problems, don't hesitate to ask the TA or me for help. Depending on the circumstances, I will go over the problems during office hours or in class.

Grades

There are four grading components to the course: quizzes, problem sets, an empirical project and a final exam. Submission deadlines are always at 6 PM on the day of the class. Four problem sets based on the lectures and homework will be given during the course of the semester. Answers to the problem sets do not have to be typeset in LaTeX, but it is highly recommended that students use LaTeX so that they can begin to get comfortable using it. Each problem will have 5 questions for 1 point each.

- There will be three quizzes. Quizzes will be conducted at the start of the class and each quiz will be between 45 mins and 1 hour long. There will be no make-up quizzes. However, the lowest quiz grade will be dropped. Each quiz will have 10 questions for 1 point each.
- Working in groups of three, students must also complete an empirical project. Students must replicate findings of a published academic article. A shortlist of suggested topics and papers will be provided but students can draw inspiration for a paper from websites like Microeconomic Insights or VoxDev. Topic must be finalized in consultation with the instructor. Students will be required to submit the project using Overleaf/coded in LaTeX. Details of what analysis is expected in the empirical project will be discussed in class and posted on the course ELMS/Canvas website. Grading criteria for the empirical project will also be communicated to the students in advance. There will be at least five factors of evaluation (a) successful ‘pure’ replication of analysis code; (b) summary of paper and links to concepts covered in class; (c) data visualization of results in the paper that do not have a graph; (d) clean data prep/managment, folder organization and timely project management; and (e) presentation in class using LaTeX/Beamer. There are multiple ‘milestones’ to completing the empirical project and students should adhere to the outlined schedule. More details will be provided in class.
- A final exam will be given during the 15th and final meeting. The exam will cover all topics covered in the course. It will have 15 questions for 2 points each.

The course will be graded using the following weights:
Problem sets : 20% (each problem set will account for 5%)
Quizzes : 20% (each quiz will account for 10%)
Empirical project : 30% (rep 5%, summary 5%, data viz 5%, data org 5%, presentation 10%)
Final exam : 30%

At the end of the term, every student will have a numerical course grade between 0 and 100. There will be a curve. Cutoffs will be decided at the end of the semester, based on past experience and professional judgement. Students’ performance relative to the class will be considered and absolute standards of professional competence will also be taken into account. A student demonstrating excellent mastery of the subject will get A or A-, while one who shows good mastery will get B+ or B. Any student receiving B- should be concerned about their ability to complete the program. (Students whose GPA falls below a 3.0 are placed on academic probation. See section below on ‘academic progress’.) The cutoffs used to rank students will respect the ordinal ranking of numerical course grades i.e. no student with a given numerical course grade will receive a lower letter grade than someone else with a lower numerical course grade.

Please report grading issues in writing. In case of grading problems, the entire quiz/exams will be re-graded.

Course Schedule

The course will meet for 15 classes as per the following schedule. There will be two sessions in each class, a lecture and a lab. Each session will last 75 mins. It is possible that some weeks are more lecture or programming intensive than others. There will be a 15-minute break between sessions. All classes, except the make-up class, will take place in-person. The make-up class on Saturday, November 12 will be on Zoom. The link will be shared closer to the date.

A tentative course plan is as follows. Readings for lectures and lab will be assigned a week before class.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture topic</th>
<th>Lab</th>
<th>Due before class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/30</td>
<td>Causality using descriptive statistics</td>
<td>Introduction to Stata: Stata screen, types of variables and summary stats</td>
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<tr>
<td>2</td>
<td>9/6</td>
<td>Measurement and data visualization</td>
<td>Introduction to LaTeX: creating a document, basic formatting and adding math</td>
<td>Empirical project: topic list (at least 3 areas of interest)</td>
</tr>
<tr>
<td>3</td>
<td>9/13</td>
<td>Prediction and linear regression</td>
<td>Working with do and log files, visualizing bivariate correlations, regress, predict, lfit, adding exported graphs to tex files</td>
<td>Problem set 1, Empirical project: topic proposal</td>
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<tr>
<td>Week</td>
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<td>Lab</td>
<td>Due before class</td>
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<tr>
<td>4</td>
<td>9/20</td>
<td>Quiz 1 + Probability, conditional probability</td>
<td>Stata + LaTeX workflow to export summary stats tables, installing user written packages in Stata</td>
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<tr>
<td>5</td>
<td>9/27</td>
<td>Random variables and their probability distributions; joint distributions</td>
<td>Data management, project organization, macros and loops</td>
<td>Problem set 2</td>
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<tr>
<td>6</td>
<td>10/4</td>
<td>Sampling, sampling distributions, finite sample properties and large sample properties</td>
<td>Simulations and writing own custom programs to demonstrate central limit theorem</td>
<td>Empirical project: first draft</td>
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<td>7</td>
<td>10/11</td>
<td>Estimating uncertainty: hypothesis testing and confidence intervals</td>
<td>Making self-contained graphs and tables in Stata + LaTeX</td>
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<tr>
<td>8</td>
<td>10/18</td>
<td>Quiz 2 + Inference about means and proportions</td>
<td>TBD</td>
<td>Problem set 3</td>
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<tr>
<td>9</td>
<td>10/25</td>
<td>Inference about variance</td>
<td>TBD</td>
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<td>10</td>
<td>11/1</td>
<td>Multiple regression model and OLS: mechanics and interpretation</td>
<td>Reporting regression results and interpreting regression output</td>
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<td>11</td>
<td>11/8</td>
<td>Multiple regression model: estimation and inference</td>
<td>Magnitude of point estimate (economic significance) vs statistical significance</td>
<td>Problem set 4</td>
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<tr>
<td>11</td>
<td>11/12</td>
<td>Make-up class - Multiple regression analysis: testing multiple linear restrictions</td>
<td>Exporting Stata results to LaTeX</td>
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<tr>
<td>12</td>
<td>11/15</td>
<td>Quiz 3 + special topics (spatial data)</td>
<td>Making maps in Stata</td>
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<td>13</td>
<td>11/22</td>
<td>No class/Early release for Thanksgiving</td>
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<td>14</td>
<td>11/29</td>
<td>Symposium - student presentations</td>
<td>No lab</td>
<td>Problem set 5, Empirical project: final draft</td>
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<td>Week</td>
<td>Date</td>
<td>Lecture topic</td>
<td>Lab</td>
<td>Due before class</td>
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<tr>
<td>15</td>
<td>12/6</td>
<td>Final exam</td>
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Course Communication

We will use ELMS on a regular basis to post announcements, documents, readings, and grades. Please check the course website at least twice a week: https://umd.instructure.com/courses/1332352 You must also check your UMD email daily and update your contact information at https://identity.umd.edu/profile

If you are sending me an email, please prefix the subject line with [ECON 643]. In case you don't hear from me in 48 hours, please resend the email. Feel free to email to:

1. Inform me about real emergencies and/or excused absences.
2. Send interesting articles related to topics we are covering in class.
3. Ask for brief clarifications on class policies, homework, problem sets or lectures (always send a screenshot)

However, do *not* use email to:

1. Ask for lengthy explanations on homework or problem sets. Such questions must be asked during office hours.
2. Ask for broad and open-ended questions that are not easy to answer on email.

If you have a question about Stata, always mention exactly what you did and the verbatim error message. Please read the instructions on Statalist on how to ask a question:

Do write carefully; be precise and include all relevant detail.

For instance,

● Don't say "Stata crashed" when you mean "Stata issued an error message" (and then tell us the error message). Say crashed only if you mean crashed as in crashed and burned.
● Don't say "many variables", say "around 50 variables" or, even better, "52 variables".
● Don't say "a big dataset", say "a dataset of 50 variables and approximately a million observations".
● Don't say "I ran a regression and then "", say "I ran regress and then "".

University Policies and Practices

Policies related to all graduate courses at the University of Maryland are posted on the Graduate School's website:

https://gradschool.umd.edu/faculty-and-staff/course-related-policies
https://academiccatalog.umd.edu/graduate/policies/
Please familiarize yourself with these policies related to academic integrity, non-discrimination policy, accessibility, absences and accommodations, grading, academic standing, grievance procedures, and other important policies.

*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.

*Excused Absences and Required Documentation:* The following are considered absences that may be excused, provided adequate documentation is submitted ahead of the excused absence. In cases of emergency, documentation after the absence may be accepted.

1. Significant religious holidays as listed [http://www.interfaith-calendar.org/](http://www.interfaith-calendar.org/) (Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance.)
2. Serious illness or hospitalization: signed note from a doctor (date of the visit as well as doctor’s contact info must be on document) stating the student is too ill to attend classes and requires bed rest for a stated period of time and dates. A visit to see a doctor does *not* count as an excused absence.
3. Death of relatives: a copy of the obituary or a funeral notice must be provided.

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 to work with study partners, the teaching assistant, and the instructor 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 an excused absence, get in touch with the instructor as soon as you are able to – 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’ve been 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.
**Academic Integrity and Student Conduct Codes:** Academic dishonesty is defined as cheating, fabrication, facilitating academic dishonesty, plagiarism, self-plagiarism. Violation of the Code of Academic Integrity may result in a 'XF' grade or suspension or expulsion from the University (even for a first offense). Additionally, on all work submitted for assessment that is not specifically exempted by the instructor, students are encouraged to write and sign the following pledge: "I pledge on my honor that I have not given or received any unauthorized assistance on this assessment."

**Accessibility and Disability Services (ADS):** The University of Maryland is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefit of services, programs, or activities at the University. Any student who may need an accommodation based on the potential impact of a disability should contact the Testing Office to establish eligibility and to coordinate reasonable accommodations. It is the student’s responsibility to share an electronic copy of their accommodation letter with the course instructors in courses the student chooses to implement their accommodations. For additional information please refer to [https://counseling.umd.edu/ads](https://counseling.umd.edu/ads) and [https://counseling.umd.edu/ads/currentads](https://counseling.umd.edu/ads/currentads)

**The Counseling Center:** The Counseling Center provides comprehensive support services that promote the personal, social, and academic success of UMD students. The Counseling Service in the Counseling Center is the primary campus provider of free and confidential therapy to help UMD students manage personal, social, and academic challenges. Staffed primarily by licensed psychologists, the Counseling Service also conducts campus outreach presentations, provides emergency response services, and assists with referrals to off-campus mental health providers. For additional information please refer to: [https://counseling.umd.edu/cs/about](https://counseling.umd.edu/cs/about) and [https://counseling.umd.edu/cs/commonconcerns](https://counseling.umd.edu/cs/commonconcerns)

**University Health Center:** The University Health Center, a department within the University of Maryland Division of Student Affairs, provides high-quality, cost-effective health care and wellness programs in order to promote the health of the University community and support academic success. It covers both Medical & Behavioral Health and Wellness & Advocacy. Also part of the University Health Center is the HEAL line. The HEAL Line is available for students or employees who have questions or concerns related to a recent positive COVID test or exposure. To report a positive COVID-19 test or exposure, visit [https://health.umd.edu/HEAL](https://health.umd.edu/HEAL). For more information please visit [https://health.umd.edu/](https://health.umd.edu/)

**Graduate Academic Counselor:** The UMD Graduate School also has an academic counselor available to support students who are having difficulty navigating mental health resources on campus, are considering a leave of absence and/or need assistance finding mental health care off campus. The Graduate Academic Counselor also facilitates bi-weekly Graduate Student Circle Sessions which provide an opportunity to learn about resources and connect with other graduate students. Students can learn more about the Graduate Academic Counselor by going to: [https://gradschool.umd.edu/gradcounselor](https://gradschool.umd.edu/gradcounselor)
COVID Policies: Up-to date information about UMD COVID-19 policies and guidance are posted at [https://umd.edu/4Maryland](https://umd.edu/4Maryland) Given the evolving nature of the pandemic, the guidance and policies are subject to change. The plans are always coordinated with state and county health officials, with additional guidance provided by the University System of Maryland. The focus will always be on the health and well-being of our entire campus community. Students should read announcements they receive about COVID related guidance and policy, and to stay familiar with the information.

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. When classes need to be canceled during the semester, we make every effort to schedule makeup classes.

Security: In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, students should follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.

Course Evaluations: Near the end of the term, students will receive an email inviting them to submit a voluntary and anonymous course evaluation. Please submit your course evaluations on time. Feedback on courses will be very helpful in improving the quality of instruction.