

ECON 342-01 – Econometrics

SPRING 2016 SYLLABUS

Class Schedule	MW 12.50–2.20pm, Hepburn 111
Instructor	Dr. Emir Malikov
Office	Hepburn 204
Phone	(315) 229–5436
Email	emalikov@stlawu.edu
Office Hours	Tue and Wed 3.00–4.30pm, whenever my door is open (usually, in afternoons) or by appt
Teaching Assistant	Kersey Reed (ksreed12@stlawu.edu)

COURSE DESCRIPTION

Econometrics is based on the application of statistical methods for estimating economic relationships, testing economic theories/hypotheses and evaluating the effectiveness of public policies. Econometrics is distinct from mathematical statistics in that the former is primarily concerned with evaluating observational rather than experimental data. While econometrics is often used to make macroeconomic forecasts, researchers also use econometric methods to evaluate causal relationships such as the effect of technology on classroom performance, the impact of education on wages and the effects of incarceration rates on crime just to name a few. In fact, the vast majority of empirical research in economics utilizes econometrics.

TEXTBOOK

The required textbook is *Introductory Econometrics: A Modern Approach*, 6th Ed., by Jeffrey M. Wooldridge of Michigan State University. Should you decide to purchase an older edition of the textbook, please be prepared for discrepancies in the text which I will not be able to help you with.

PREREQUISITE KNOWLEDGE

The solid knowledge of algebra and calculus is expected of all students. Be comfortable with the letter/symbol based representation of equations. You should also be comfortable with basic statistical concepts such as the expected value, (co)variance, distribution, etc., which you learned in your quantitative methods or stats prerequisite course. Some concepts will be *briefly* reviewed at the beginning of the semester. Appendices in Wooldridge's textbook will also prove to be a great source for a review of the background material.

QRC. If you need help with math throughout the semester or wish to have someone refresh your memory of basics at the beginning of the semester, the QRC is a good place for that. The center offers mentoring in all quantitative areas.

STATA

Throughout the semester we will be applying the econometric tools discussed in class through the use of the STATA statistical package. STATA is a complete, integrated statistical package that provides everything you need for data analysis, data management, and graphics. It is currently one of the most widely used statistical packages among economists. Familiarity with STATA is a

crucial element of this course and most of your problem sets will ask you to utilize it. Furthermore, you will also complete an empirical project in this course and will be asked to turn in your STATA programs and output with your paper. The path to access STATA through the SLU network is
 \\saint\apps\netapps\depart\econ\Stata10

WORKLOAD

You should be prepared to devote roughly 1.5–2 hours of your time for every hour of in-class time (approx. 4.5–6 hours per week) to studying, practicing techniques and solving problems. This class is cumulative so it is essential that you do not let yourself get behind from the very beginning. As a good studying strategy, I suggest you to make sure you actively learn while in the classroom as opposed to merely copying the notes down from the blackboard. Further, do not postpone studying relevant material until a quiz/test comes but rather study on a regular basis. I strongly encourage you to see me, your TA or folks at the QRC whenever you encounter problems. You are also encouraged to form a study group. It helps in understanding the material when you are able to explain your thoughts to your fellow students.

GRADING & ASSIGNMENTS

Your course grade is made up of the following components:

<i>Component</i>	<i>Weight</i>
Class Participation	5%
Quizzes	7.5%
Problem Sets	20%
Exams ($\times 2$)	45% (22.5% each)
Empirical Project	22.5%

At the end of the course, your score on each of the above components will be converted to a 100 point based scale. Your final score in the class will be a weighted average of these points. I will then map your final score (also on a 100 point based scale) to the grade you will receive in the course using the following table.

<i>Course Grade</i>	<i>Min Cumulative Score</i>	<i>Course Grade</i>	<i>Min Cumulative Score</i>
4.00	97	2.25	75
3.75	93	2.00	72
3.50	90	1.75	69
3.25	87	1.50	66
3.00	84	1.25	63
2.75	81	1.00	51
2.50	78	0.00	50 and below

IMPORTANT: You may NOT take this course as pass/fail.

NOTE #1: Depending on how hard the homework and exams turn out to be, I may need to reduce the points required for each grade. I will notify you of any such changes.

NOTE #2: Requests to revise grades on exams, homeworks and other assignments are accepted in writing only. Please compose a brief letter argumentatively explaining (point by point) why you think your grade should be changed, then turn in this letter along with the original assignment back

to me. You may contest your grade within two weeks from the date your graded assignments was returned to you.

Attendance. While attendance is not required *per se*, it is however highly recommended. Clearly, attendance is necessary for class participation for which you earn credit. Most importantly, given the level of difficulty of the subject matter, I guarantee that you will struggle with the material if you skip lectures. In my experience, student performance in the class is highly correlated with attendance.

Class Participation. The success of the course depends heavily upon the contributions of each student. It is you who makes the class more fun! I expect you to come to class prepared and willing to contribute to the class discussion, which constitutes a part of your course grade. Hence, make sure to keep with the material as well as to never be shy to ask questions or to share your thoughts. This is an easy way to earn points, so do not miss out. Occasionally, you will also be asked to split into groups and jointly work on problems in class.

Quizzes. To entice you to keep up with the course material, I will occasionally give you a short in-class quiz. The quizzes will mainly cover the material recently learned in class. I will announce the quiz one class in advance (yet another incentive for the class attendance). There will be no make-up quizzes.

Problem Sets. Problem sets will be assigned often throughout the semester. The assignment will include both the analytical/quantitative problems, which you will need to solve “by hand”, as well as problems that will require STATA programming. Homeworks are challenging, and I therefore advise you to start working on them as soon as they are assigned.

All assignments are due at the beginning of class. Only hard copies, including the print-outs of STATA code and output, will be accepted — please do not email me your assignments. Late submissions will be accepted (for half credit) only if the solution key has not been posted yet. Please do your homework neatly. If more than one sheet of paper is required, make sure to staple them together with your name on each sheet. Unstapled assignments will not be accepted. The grade for each problem set will be based on the percentage of available points that you earn, i.e., converted to a 100 point based scale.

You are encouraged to work out the problems in a group with your classmates. However, each of you must submit a separate work of your own. I recommend that you sit on your own when completing the final draft of your homework. If I suspect that two or more students have turned in substantially identical work, I will ask the academic honor council to determine if academic dishonesty has occurred. If they deem that academic dishonesty has occurred on the homework I will recommend a zero for the entire homework portion of your final grade.

Empirical Project. You and your partner(s) will conduct an empirical project and write a paper on it. The project is meant to demonstrate your ability to use econometric techniques in a practical context. The paper should include separate sections for each of the following: Abstract, Introduction, Conceptual Framework, Data Description, Empirical Methods, Results, Conclusion and References. The paper must be at least 5 (1.15pt-spaced) pages long. Detailed instructions will be discussed in class.

Exams. Exams will primarily focus on the material most recently covered in class. Exams are always and everywhere your work. If I find that you have copied off a classmate, I will forward the case to the academic honor council with the recommendation that you fail the course if found guilty.

The dates of midterm exams are to be determined depending on the flow of the class. You should expect them in late February and early April. I will announce the exact dates of both midterms at

least two weeks in advance. There is no final in this class.

MAKE-UPS

- No make-up quizzes, homework assignments or exams.
- The lowest quiz score will be dropped.
- If you must miss an exam/quiz because of a SLU sanctioned event, please make an arrangement with me in advance. If you fail to do so ahead of time, you will receive a zero for that exam/quiz. The format of a make-up exam/quiz is at my discretion.

ANNOUNCEMENTS

All announcements (including homework assignments) as well as supplementary material will be posted on *Sakai*. It is your responsibility to check for announcements at least once a day.

OFFICE HOURS

My posted office hours are from 3 to 4.30 pm on Tuesdays and Wednesdays. If you cannot make it during these hours, please email me for an appointment and we will make it work. You are also welcome to come by my office (for help, advice or just to talk) whenever my door is open. However, it is preferable to both you and I that you make an appointment with me so that I reserve enough time for us to go over whatever questions you may have. Please also note that I'm mostly unavailable on Fridays.

EMAILS

If you cannot make it to see me in my office, feel free to email me with any questions — I will be happy to help. However, please keep in mind that it is nearly impossible to meaningfully answer *conceptual* questions via email. In such instances, I will customarily ask you to see me in person in order to get your question answered/explained.

I do not discuss students' grades over email, period. While it is pleasing to see that you are concerned about your performance in class, please do not email me about the latter, but rather stop by my office to talk about it in person.

Lastly, while I am fairly quick in responding to students' emails, emails (except those on urgent matters) sent to me over the weekend and/or after 5 pm on week days generally will not be replied to sooner than the morning of the following working week day.

CLASSROOM ETIQUETTE

Please be considerate to myself and those around you:

- Turn off your cell phones before the lecture starts. This also implies no texting/facebooking/instagraming/snapchatting or playing with your iPads during the lecture, not even under the desk. If I see you using a phone, tablet, etc., during class and it does not appear to be for a legitimate class purpose, I will call on you.
- The use of laptops is permitted for course-related purposes only. If you do use a laptop, please sit in the front row.
- Please wait until the lecture ends before gathering your belongings.

- If you need to leave early, please sit near the door. If you arrive late to class, please minimize the distraction to the lecture.
- Please do not eat in class, unless you have valid medical reasons for that.

CALCULATORS

For exams, you will need a simple calculator. Graphing calculators, programmable calculators, and cell phones are not allowed. Sharing calculators is prohibited during exams.

ACADEMIC HONOR POLICY

The academic honor policy outlined in the Constitution of the Academic Honor Council will be enforced in this class. An online copy of the constitution can be found [here](#).

STUDENTS WITH DISABILITIES

If you have a disability and may need accommodations please be sure to contact the Disability and Accessibility Services Office right away so they can help you get the accommodations you require. If you need to use any accommodations in this class, please submit to me a letter from Disability and Accessibility Services in a timely manner so that you can have the best possible experience this semester. Please inform me of any accommodations that you need at least 10 days before the exam and/or assignment deadline.

RELIGIOUS OBSERVANCES

If you have a conflict with a scheduled exam, assignment or some other course requirement due to religious obligations, please inform me of this at least 10 days before the exam and/or deadline.

COURSE OUTLINE

This course outline is tentative and subject to change as the semester progresses. Chapter annotations in [blue](#) ([red](#)) correspond to the [5th](#) ([6th](#)) edition of the textbook.

(1) Introduction & Review

What is Econometrics? ([Ch. 1](#)) [[Ch. 1](#)]

Math and Stats Review ([Appendices A.1–A.3, B.1, B.3](#) [pp. 730–736], [B.4, C.1–C.2](#)) [[Appendices A.1–A.3, B.1, B.3a–B.3g, B.4, C.1–C.2](#)]

(2) Simple (Univariate) Regression

Estimation

- OLS and its Derivation ([Ch. 2.1–2.2](#)) [[Ch. 2.1–2.2](#)]
- Algebraic Properties of OLS ([Ch. 2.3](#)) [[Ch. 2.3](#)]
- Goodness-of-Fit ([Ch. 2.3](#)) [[Ch. 2.3](#)]
- Expected Value & Variance of OLS Estimator ([Ch. 2.5](#)) [[Ch. 2.5](#)]
- Gauss-Markov Theorem ([Class Notes](#)) [[Class Notes](#)]

(3) Multiple (Multivariate) Regression

Estimation

- Estimation and Algebraic Properties ([Ch. 3.1, Ch. 3.2](#) [pp.72–74, 77]) [[Ch. 3.1, Ch. 3.2a, Ch. 3.2e](#)]

- The “Partial Effect” Interpretation (Ch. 3.2 [pp.74–78]) [Ch. 3.2b–3.2g]
- Goodness-of-Fit (Ch. 3.2 [pp.80–81]) [Ch. 3.2h]
- Expected Value & Variance of OLS Estimator (Ch. 3.3 [pp. 83–87], Ch. 3.4–3.5) [Ch. 3.3 [pp. 73–77], Ch. 3.4–3.5]
- Omitted Variables (Ch. 3.3 [pp. 88–92], Ch. 3.4 [pp. 98–99]) [Ch. 3.3a–3.3c, Ch. 3.4b]

Inference (Hypothesis Testing)

- Sampling Distribution of OLS Estimator (Ch. 4.1) [Ch. 4.1]
- Single Exclusion Restriction Test: t -test, p -value, Confidence Intervals (Ch. 4.2–4.3) [Ch. 4.2–4.3]
- Single Linear Combination Restriction Test (Ch. 4.4) [Ch. 4.4]
- Multiple Exclusion Restrictions Test: F -test, p -value, Confidence Intervals (Ch. 4.5) [Ch. 4.5]

Large Sample (Asymptotic) Properties

- Consistency (Ch. 5.1) [Ch. 5.1]
- Asymptotic Normality (Ch. 5.2 [pp. 173–177]) [Ch. 5.2 [pp. 154–157]]

(4) Selected Modeling Issues

Functional Form (Ch. 2.4 [pp. 41–44], Ch. 6.2 and Appendix A.4) [Ch. 2.4b–2.4c, Ch. 6.2 and Appendix A.4]

Overfitting and Goodness-of-Fit (Ch. 6.3) [Ch. 6.3]

Effects of Data Scaling (Ch. 2.4 [p. 40], Ch. 6.1) [Ch. 2.4a, Ch. 6.1]

(5) Binary (Dummy) Explanatory Variables

Interpretation (Ch. 7.1–7.2) [Ch. 7.1–7.2]

Interaction Terms (Ch. 7.4) [Ch. 7.4]

Treatment of Ordinal Variables (Ch. 7.3) [Ch. 7.3]

(6) Heteroskedasticity

Heteroskedasticity and Its Consequences (Ch. 8.1) [Ch. 8.1]

Robust Inference (Ch. 8.2) [Ch. 8.2]

GLS and FGLS (Ch. 8.4 [pp. 280–291]) [Ch. 8.4a–8.4c]

(7) Model Misspecification

Functional Form Misspecification (Ch. 9.1) [Ch. 9.1]

Proxy Variables for Unobservables (Ch. 9.2) [Ch. 9.2]

Measurement Error & Attenuation Bias (Ch. 9.4) [Ch. 9.4]

(8) Endogeneity and IV Estimation

System of Simultaneous Equations

- Simultaneous Equations & Simultaneity Bias (Ch. 16.1, 16.2) [Ch. 16.1, 16.2]
- Identification (Ch. 16.3 [560–564]) [Ch. 16.3a]

Instrumental Variables

- IV Estimation of Simple Regressions (Ch. 15.1) [Ch. 15.1]
- Weak Instruments Problem (Ch. 15.1) [Ch. 15.1]
- IV Method of Moments Estimation of Multiple Regressions (Ch. 15.2) [Ch. 15.2]
- 2SLS (Ch. 15.3) [Ch. 15.3]

Testing for Endogeneity and Exogeneity (Ch. 15.5) [Ch. 15.5]

(9) **Limited Dependent Variables**

Linear Probability Model (Ch. 7.5, 8.5) [Ch. 7.5, 8.5]

Logit and Probit (Ch. 17.1 [584–587]) [Ch. 17.1a–17.1b]

(10) **Panel Data Models**

Fixed Effects: FD, LSDV and Within Estimators (Ch. 13.3, Ch. 14.1 [484–491]) [Ch. 13.3, Ch. 14.1 [435–440]]

Random Effects: WLS Estimator (Ch. 14.2) [Ch. 14.2]

Fixed vs. Random Effects: (Ch. 14.2) [Ch. 14.2]