APPLIED ECONOMETRICS I

Fall 2018   Dr. Steven Myers
5:45 PM – 7:00 PM MW, CBA 145   Office: CBA 323
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Email to myers@uakron.edu is preferred for all correspondence and always include **E626 Fall 2018** in the subject line.
You may text my cell as well.

First instructional day: Monday August 27, 2018
Last instructional day: Wednesday December 5, 2018
Final examination: Monday December 10, 2017 5:15 PM – 7:15 PM

Office Hours

I intend to keep the following office hours. This is subject to change as others impinge on my time for department meetings and stuff like that.
Tuesday 2:00 pm – 4:00 pm
Wednesday 3:00 pm - 4:00 pm
Thursday 3:00 pm – 4:00 pm
I intend to also be in my office on many Monday afternoons as well. Meetings get scheduled from time to time during my hours so please send an email ahead of your visit if you can.

Course Description

Prerequisite: Admission to the master's program in economics or permission of the department.
Students will learn programming, statistics and standard econometric tools by reading and conducting team-based empirical research requiring problem articulation, data assembly and appropriate model specification.

Computer Support

This course will use DyKnow Vision on Tablet PCs as assigned by the department of economics. You must bring the Tablet PC to class each day. Remember you are responsible ($) for them so treat the Tablets well. Learning to use SAS 9.4, installed on your tablet, is a critical part of this course and the next.

It is a good practice to have cloud based space where you can access your data from multiple devices. One cloud solution on campus is Zipspace https://support.uakron.edu/wiki/index.php/Zipspace.

Keep all your data constantly backed up, this is your responsibility.

You may use your own laptop if it is Windows based, and it can support both a SAS and the DyKnow download and installation, as well as any other software needed such as Notepad++. You must have the full MS office sweet especially including Excel as well.

SAS specific requirements

1. SAS 9.4 is installed on your department issued computers. We will be using SAS extensively in this course.

2. SAS has various interfaces (1) windowing environment (2) SAS Enterprise and (3) SAS studio for example. We will use (1) almost exclusively, never use (2) and refer to some cool features of (3) at times.
3. **Get SAS**: You can download SAS to your computer if and only if you have a Windows computer and plenty of space and RAM.
   a. How? Go to the Technology Support tab of https://my.uakron.edu and click on the software link, software downloads. Find SAS and read the paragraph clicking the correct link which is probably the SAS icon. At the new page navigate to the SAS tab and click it. Then click on SAS 9.4 and follow all prompts. Give yourself time to install this and make sure you are in a fast internet environment such as on campus.
   b. This should install the SAS windowing environment as choice SAS 9.4 (English). You will also see a lot of choices in your start menu including SAS Studio.
4. **GET SAS alternative**: SAS Virtual lab.
   a. How? Go to the Technology Support tab of https://my.uakron.edu and click on the UA Virtual Lab. This opens up a window that explains what the virtual lab is. When ready click on the green button that says "Virtual Lab >"
   b. You will be presented with a choice for VMware Horizon. You might want to choose HTML Access the first couple of times, but if you are going to make use of this Virtual SAS you should download the VMware Horizon Client.
   c. If you shoes the HTML interface then you will be prompted for your UAnetID (or email) and password. Press login.
   d. At the next screen choose statistics and on the next screen (after it "chats with you") you will see a Virtual Windows 10 screen with a SAS 9.4 shortcut. You can take it from here.
5. A third version that you can use after you are away from the University is called SAS University edition. It runs like the SAS Virtual Lab here on campus and supports SAS Studio.
   a. https://support.sas.com/en/software/university-edition.html
   b. Do not use this this term unless you find yourself away from your computer and have someone else's and need to work.

Required Books

G. S. Maddala, and Kajal Lahiri , Introduction to Econometrics, 4th Edition, Wiley, December 2009, ©2010 (ISBN : 978-0-470-01512-4) 654 pages (Amazon: http://amzn.to/2w9ajt6, $67 paper)

Kennedy, Peter. A Guide to Econometrics, 6th edition, Wiley-Blackwell, Feb. 2008, ISBN- 978-1-4051-8257-7 (Amazon: http://amzn.to/2w90J9s, $39)

Delwiche, Lora and Susan Slaughter. The Little SAS Book: A Primer, 5th edition, SAS Publishing, November 7, 2012, 350 pages, ISBN 1612903436 (Amazon: http://amzn.to/2wzQOL1, $44)

Salvatore, Dominick. Theory and Problems of Statistics and Econometrics, Schaum's Outline Series in Economics, Second Edition, McGrawHill, January 27, 2011, 0-071-75547-0. (Amazon: http://amzn.to/2wfITzW, $13)

Optional Books

Illowsky, Barbara and Susan Dean. Introductory Statistics, OpenStax College, November 2013. (ISBN 1938168208) Free access at https://openstaxcollege.org/textbooks/introductory-statistics (This is an introduction to statistics text and is not a mathematical statistics support book).

Other Useful Sources Online:

SAS Online documentation for version 9.4. This is available through the help menu once you are in the SAS program. You can also get to it on the web at http://support.sas.com and specifically at http://support.sas.com/documentation/94/index.html   (for a web based solution)

SAS/Base http://support.sas.com/software/products/base/index.html
SAS/STAT http://support.sas.com/software/products/stat/index.html#documentation
SAS/ETS http://support.sas.com/software/products/ets/index.html#documentation

Expectations for the Course:

No economic data analyst is complete without a firm grounding in economic theory and application courses, in statistics and econometrics, in the tools of the trade and in communication skills. In a very important way, the latter of these, communication, is the most important. You may be a great economist, but if you cannot communicate your ideas and results of analysis no one will pay attention to your work. Further if you are unable to produce professional quality manuscripts, few will take you seriously. In this course writing and speaking is very important. All of your work must be produced at a professional level and quality.

Learning Objectives

- To understand the mathematical and statistical underpinnings of empirical techniques
- To understand the role of economic theory in modeling empirical studies
- To understand the relationship between theoretical economics and empirical approaches
- To understand the art and science of data techniques for both small and large data sets, including an appreciation for so called 'big data' techniques.
- To achieve proficiency in SAS
- To understand the art and science of model specification
- To understand how to articulate problems and to engage in problem solving in teams
- To understand how to conduct research that embraces all of the above learning objectives

Why a course in Applied Econometrics is more than a Theoretical Econometrics course

The student should be aware that the title of this course follows the premise of Peter Kennedy who instructs us that the proper teaching and learning of applied econometrics builds on a required foundation of classical and theoretical econometrics. That is the teaching of an empirical course in econometrics designed to help students learn to "do econometrics" is not a course just of techniques and computer operation, but rather falling integrated as an extension of the theoretical foundations of traditionally taught econometrics. That is, the role of inference is central to this course and covers both classical and applied foundations.

Inference	
Classical inference	**Applied inference**
Estimation techniques	Problem Articulation / Research Hypothesis
Hypothesis testing techniques	Data finding / cleaning / management
	Model Specification

A visual representation of this course and its antecedent follows. This term this course will expand on the breadth and depth of foundation begun in the previous course.

Econometrics

Statistical inference

Basic Statistical Theory

Fall ⎰ • E626

Spring ⎰ • E627
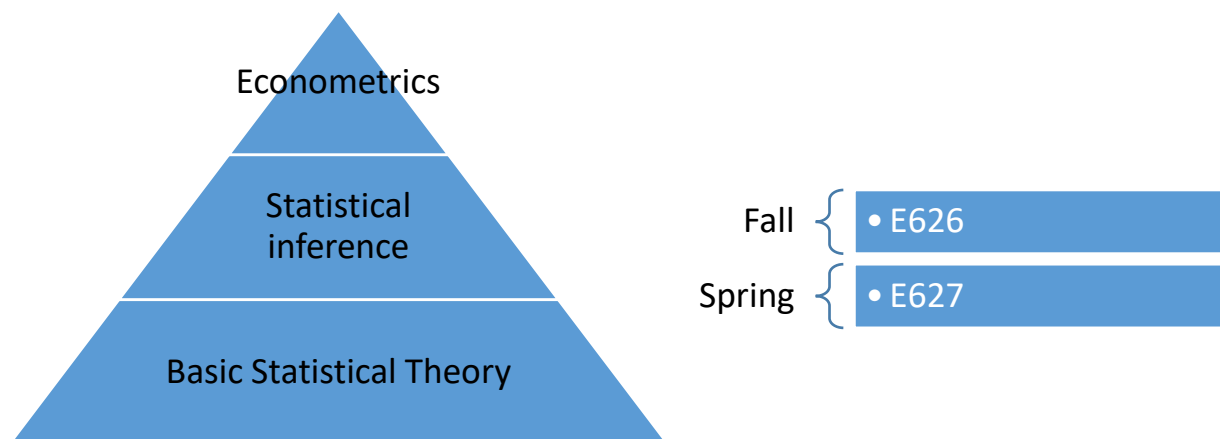
Data Science Component

This course will explain the concepts of a scientific approach to economic data analytics which covers the stages of all research projects, namely data acquisition, data management, data analysis and reporting/visualization. Data in this course will come from both small and large structured data sets and the student will learn and practice the
ly

- acquisition
- data management and data cleaning
- scientific analysis
- the art of communicating through reporting and visualization.

The programs in the course include SAS and Excel. The latter is introduced in other courses in the master's sequence, but students will be given access to the program.

The outline this term

Weeks 1 and 2 - Module 1
        Introduction to Econometrics
        Statistical overview
        DyKnow, SAS, Excel and FRED

Weeks 3 to 6 - Module 2
        Monte Carlo derivation of sample distributions
        Sets, Theoretical distributions, probability and Mathematical Expectation
        Descriptive Statistics as exploratory data analysis
        SAS Programming / simulation of experiments

Week 7 - Midterm week

Weeks 7 and 8 - Module 3
        Matrix Algebra and the derivation of estimators and inference in multiple regression
        Inference from one-variable to multiple regression
        SAS estimation of regression and inference, Proc REG, Proc ETS

Week 9 to Week 15 - Module 4
        What is Applied Econometrics?
        Simple Regression

Multiple Regression
Multicollinearity
Dummy Variables
Hypothesis Testing Strategies
Specification and Misspecification
Dummy dependent variables, Probit and logit, using PROC QLIM (if time)
Simultaneous and Instrumental Variables (likely no time for this), Proc SYSLIN

Weeks 8 to 15 - Module 5
This is the time used for the empirical team based project and will run parallel to Module 4.
Problem Articulation
Empirical Study
Problem Based Learning
Group research dynamics

Week 16 – Monday December 10 – in class final examination

The course will draw on Maddala and Lahiri, Chapters 1 to 4, 7.1-7.3, 8.1-8.5, and parts of Chapter 10.
It will also draw on Kennedy Chapters 1-5, 15 and 22.

Course Policy:

We will closely follow both the texts and class notes. You are advised to attend all class sessions due to the rigor of the material. Lectures are designed to assist you in your study of Applied Econometrics, not to substitute for careful reading and study. The lectures will often follow a theorematic approach. Chronic absence is grounds for dismissal from the course.

Homework will be due the date stated in Brightspace.uakron.edu. Most of your work will have to be uploaded to a particular assignment space in Brightspace. In some cases, homework will cover material not yet discussed in class. Homework will be either graded in the traditional sense or just checked to see if completed. Student questions will be answered as time allows and selected problem will be discussed based on your collective scores. Students having difficulty should talk to the professor often.

Unexcused late work will not be accepted or if accepted will be subject to a rather high penalty. The problem sets will be graded selectively, in total, or in part, and returned as soon as possible.

> Important: **Students must attempt all assigned problems and should hand in all of their work on each problem to maximize the amount of credit received.** This is necessary even if you can not derive a satisfactory answer. Note well, that how one arrives at an answer is often more important than the answer itself.

Students are encouraged to form study groups. While these groups are helpful to the successful completion of the course, make sure that each member of the group does a fair share and that the work you hand in is your own. Some assignments will require group work with groups being assigned in class.

Assessments
- There will be two scheduled examinations: an individual and team-based midterm and an individual final.
- Computer homework (as assigned)
- Problem homework (as assigned)
- A team-based problem based learning project will also be assigned and due towards the end of the term.
- Unannounced quizzes may be used to judge the progress of the class as the need warrants.

- Fairly equal weight will be given each examination, the team based project and the set of assignments of worked problems and computer problems. That is, each part will be worth about 20% on average.

Grading Scale

A	92+
A-	90-91
B+	87-89
B	82-86
B-	80-81
C+	77-70
C	72-76
C-	70-71
D+	67-69
D	62-66
D-	60-61
F	< 60

Academic dishonesty in any form is not tolerated. If you have any doubt whether it is academically dishonest then don't do it. In particular, no reference to the work of any student, past or present, is considered academically dishonest and grounds for dismissal from the course and the University.