Teaching Dossier

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I. Statement of Teaching Philosophy

My teaching philosophy stems from my experience as a teaching assistant and instructor at Duke University. I believe five components of teaching are essential to foster effective learning: gradual and systematic transmission of knowledge, engaging students in the classroom, connecting abstract concepts to real life applications, holding students accountable for their own learning, and promoting diversity.

Gradual and Systematic Transmission of Knowledge

It has been my observation that students have a better grasp of the core concepts of a course when the course materials are built up incrementally. When fundamental concepts are gradually introduced and more time is spent on making sure students understand them, it becomes easier for students to learn the more advanced materials. The gradual transmission of knowledge should be shown in the syllabus to give students an idea of which concepts are more fundamental and therefore require more time. The instructor should also allocate enough time to address questions from students during and outside the class early in the course.

When teaching is delivered in a systematic fashion, it is easier for students to understand the connections between topics and achieve the intended learning outcomes. The systematic transmission of knowledge can be ensured by introducing topics with clear ties and citing previously covered topics in teaching. As a teaching assistant for an undergraduate level introductory econometrics course, I observed the instructor Professor Duncan Thomas citing fundamental concepts in linear regression when he introduced more advanced regression techniques using panel data. Students were able to draw connections between these topics and had more confidence in learning new concepts. It is also important to give frequent quick problem sets and immediate feedback between classes to check whether students understand the concepts, especially early in the course. I will offer help to students who are struggling with basic concepts during office hours.

Engaging Students in the Classroom

I believe students learn the most out of a course from actively engaging in it. As an instructor, I encourage student engagement through in-class brainstorming with guiding questions, group discussions, student presentations, and final projects. I have found higher student engagement when they are assigned into groups and asked to share their thoughts as a group. I provide clear guidelines and interact with each group to promptly address their questions to facilitate these discussions.

When teaching a class on Programming and Project Management for rising second-year PhD students, I asked the students what they hoped to learn from the course at the beginning of the class and explained how each section would help them achieve their goal. This discussion raised the interest among students and gave them a sense of ownership in the learning process. As a result, students actively participated in classroom discussions and internalized the course concepts.

Connecting Abstract Concepts to Real Life Applications

I believe students are more motivated to learn when they can see how abstract textbook concepts can be applied to tangible real-life questions.

For the Programming and Project Management class mentioned above, I structured the course to resemble the data analysis process of a typical empirical project suited to the students' level of expertise and used real data for in-class exercises. In each step of the data analysis process, I provided examples of how the general good practices introduced in the course can be applied to different empirical projects according to students' research interests. For instance, after introducing the concept of code compatibility, I grouped students into pairs with different research fields and asked them to write a short Stata code for importing data with the consideration for code sharing. After the class, a few students told me that the explicit connection between class materials and their own research projects kept them motivated and engaged throughout the class.

Holding Students Accountable for Learning

The role of the teacher includes not only to deliver knowledge but also to ensure students are accountable for their own learning. As a teaching assistant for Professor Duncan Thomas's introductory econometrics class, I observed him giving students quizzes at the start of lectures on random days. As these quizzes contributed to their final grade, students started reviewing previous lecture materials. Gradually, students went from performing well in quizzes to actively contributing to the intuition behind concepts that are covered in the quizzes. Students grew more interested and engaged in the course as they were made responsible for their own learning.

Promoting Diversity

In teaching and mentoring, I aim to improve the learning outcomes of under-represented groups in economics and in higher education more generally. I plan to achieve this goal by including the perspectives of different population subgroups (race, gender, ethnicity, sexual orientation, etc) in my lectures, tailoring teaching to student backgrounds, and providing additional academic and career advice to under-represented students. As the chairperson of Economics Graduate Student Council at Duke from 2016 to 2017, I organized monthly social activities for graduate students and advocated for them in the department. I have also been a mentor to under-represented incoming PhD students in the past three years and have enjoyed helping them navigate the new academic environment at Duke.

II. Teaching Experience and Interests

Instructor

I have designed and taught two Ph.D. level courses to mostly rising second-year economics Ph.D. students and a few rising second-year economics master's students.

The first course is *ECON 890-03 Introduction to R*. This class introduced the setup and logistical expressions in R to students with no prior experience with the software. During my lectures, I emphasized the applicability of R packages and commands to specific empirical analyses in economics. I encouraged student engagement by having in-class problem sets and discussing the

solutions in groups. For students with more interest in R, I provided additional advanced materials at the end of each lecture and a simple application of the concepts. At the end of the course, students partnered into groups and replicated an empirical paper of their choice in R.

The second course is *ECON890-04 Programming and Project Management*. This class introduced students to best practices in organizing projects and code. The lectures followed the flow of a typical empirical project in economic research – data cleaning, data construction, statistical analysis, and interpreting results. In each lecture, students were asked to complete short coding tasks after a project management practice was introduced. The final assignment of the course tied all the in-class tasks together and demonstrated how students would conduct an empirical project from start to finish.

Teaching Assistant

I served as a teaching assistant for an undergraduate level class *ECON208D Introduction to Econometrics: Intuition, Theory, and Applications*, taught by Professor Duncan Thomas. This was a required class for economic majors (sophomores and seniors) and had a large class size of over 120 students. There were three other graduate teaching assistants and one undergraduate teaching assistant.

Working with the other TAs, I graded in-class quizzes, out-of-class problem sets, a midterm and a final exam. We also worked with the instructor to ensure the grading rubric was clear and consistent. I led two tutorial sessions and one review session to explain the concepts students struggled the most with (as reflected in the problem sets).

This experience has taught me the complexity of teaching a large undergraduate class with a diverse group of learners. I learned to use frequent in-class quizzes to assess student understanding after introducing concepts and encourage student engagement through interactive short questions during lectures.

Teaching Training

I am enrolled in the Certificate of College Teaching program at Duke University and expect to complete the requirements by May 2020. As part of the program, I received two teaching observations from other graduate students and discussed with them about the strengths and weaknesses of my teaching style. I am also taking two courses on college teaching: *GS750 Fundamentals of College Teaching* and *GS767 Diverse Learners and Contentious Issues*. They provide tools for me to design and implement courses with clearly defined learning objectives while acknowledging the diversity in student backgrounds.

Teaching Interests

I am qualified to teach undergraduate level microeconomics and econometrics, as well as topic courses in urban, public and development economics (undergraduate or graduate). I also hope to design a graduate-level topic course on the general equilibrium effects of public policies. Drawing from my research on residential choice and long-term neighborhood effects, this course will emphasize the interactions between government policies, market forces and individual preferences.

This course will provide students with the economic tools to evaluate the welfare effects of local or national policies in both developed and developing countries.

III. Evidence of Teaching Effectiveness and Sample Syllabi

As evidence of teaching effectiveness, I present teaching evaluations for my course *ECON 890-03 Introduction to R*.

I include four sample syllabi as examples of courses I can teach:

1. *ECON 890-03 Introduction to R*. This syllabus is an example of how I would design a computational course.
2. *ECON890-04 Programming and Project Management.* This is an example of a more interactive computational course.
3. *ECON208D Introduction to Econometrics: Intuition, Theory, and Applications.* This is the syllabus for the course I served as a TA. It is an example of how I would design a large undergraduate requisite.
4. *Urban Economics.* This is the outline of an undergraduate elective I hope to teach. It introduces students to core topics in urban economics with basic tools for policy analysis.

ECON 890-03 (1142) **Summer 2017**
SPECIAL TOPICS IN ECONOMICS (Lecture) R Chuhang Yin

Scale for Questions 1-2:
5-Excellent 4-Good 3-Adequate 2-Poor 1-Very Poor

Quality of Course	**4**
Quality of the instruction	**4**

Scale for Questions 3-11:
5-Very High 4-High 3-Moderate 2-Low 1-Very Low

Amount of effort/work	**4**
Difficulty of subject matter	**3.34**
Intellectual stimulation	**3**
Instructor was enthusiastic about the course	**4**
Instructor was accessible outside of class	**4**
Participation in class discussion encouraged	**3**
Course requirements/expectations were clear	**4**
Feedback on examinations/papers/performance was valuable	**4**
Methods of evaluating student work were fair and appropriate	**5**

Scale for Questions 12-20:
5-Very Highly 4-Highly 3-Moderately 2-A Little 1-Not At All

Gaining factual knowledge	**4**
Understanding fundamental concepts and principles	**3.67**
Learning to apply knowledge, concepts, principles, or theories to a specific situation or problem	**4.5**
Learning to analyze ideas, arguments, points of view	**4**
Learning to synthesize and integrate knowledge	**4**
Learning to conduct inquiry through methods in the field	**4.5**
Learning to evaluate the merits of ideas and competing claims	**3**
Developing skills in oral expression	**1**
Developing writing skills	**1**

Written Comments

1. Please comment on the strong and weak points of instruction: 1

She teaches very well.

2. Please comment on specific knowledge, skills, etc. acquired, new / appreciation of/outlook on previous knowledge:

3. Please comment on clarity and organization of course, and / student/instructor interaction :

4. Please comment on the amount and type of thinking you did, / usefulness of readings and assignments:

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1. Please comment on the strong and weak points of instruction: 2

This was more like a class than mentioned a handful of useful packages for R rather than a class that explained what R is, how it works, how to use a package, or how to figure out how to make your code work.

2. Please comment on specific knowledge, skills, etc. acquired, new / appreciation of/outlook on previous knowledge:

3. Please comment on clarity and organization of course, and / student/instructor interaction :

4. Please comment on the amount and type of thinking you did, / usefulness of readings and assignments:

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1. Please comment on the strong and weak points of instruction: 3

Strong points: The course content and the instructor's style for teaching them were really good. The assignment were very well designed and made gleaming the contents much much easier and faster. / / weak points: More frequent homework could be more helpful to glean more. It could be like leaving some of the in-class assignments to be done at home.

2. Please comment on specific knowledge, skills, etc. acquired, new / appreciation of/outlook on previous knowledge:

3. Please comment on clarity and organization of course, and / student/instructor interaction :

The course has been well designed and structure. The materials flow in a logical order that makes learning the materials more convenient.

4. Please comment on the amount and type of thinking you did, / usefulness of readings and assignments:

ECON 890-03: Introduction to R

Summer 2017

Instructor: Chuhang Yin

Office: Social Sciences Building 325C

Email: cy81@duke.edu

Office hours: By appointment

Class location: Social Sciences 311

Class times: M/F 1-3:30PM

Overview

This class is an introduction to R. The main objective is to give you tools that are helpful in research. The topics covered in the class are as follows:

- Basics in R: R packages, basic operations, file management, objects in R, classes, tests and conversion.
- Functions: statistical functions, descriptive statistics, writing functions, conditional statements and loops.
- Good coding practices: style, debugging code.
- Data work: creating, merging, exporting and importing datasets; missing values; working with large datasets; strings and dates.
- Statistics in R.
- Regressions: OLS, IV, regression diagnostics, time series and panel data, splines, quantile regressions, regression output, bootstrap.
- Graphs in R: base graphics package, `ggplot2` package.
- Numerical optimization: different methods.
- R performance: coding tips, R packages for efficient coding, paralleling R.

If time allows, we will also cover: finite mixture models, duration models, simulation-based models, factor models, multivariate models. If you have some suggestions for topics, please contact me. The books used in preparation of the class notes are listed in the reference list. These are great books and I would recommend them if you want to continue learning R after the class. These class notes are heavily based on those by Nicolas-Aldebrando Benelli and Olga Kozlova.

Assessment

The grades will be determined by **problem sets (50%)** and a **project (50%)**. The main aim of problem sets is to advance your knowledge of R. You should complete the problems individually, but you can discuss them with your peers. In fact, I recommend you to talk to your classmates. However, copying and pasting code of your classmates is prohibited. After the homework submission, we will spend some time discussing the solutions in class.

Projects

For your project split in groups of 2 to 3 people. You will need to replicate a paper. Choose a paper from the list below or find another paper (consult with me for appropriateness). Work on real data when available (e.g., AER papers have data sets available for the published papers). If not, simulate data. You should replicate the main results of the paper (of course, if you do not have the real data, you should use the same methods but you are not expected to deliver the same numerical results). Submit a write up of results[1] and the code. You must use R for coding. The folder with a code should have a "readme" file that explains what should the files be used for. The folder should contain a master file and if I run it, it should as output give me all of the results in your write-up. Deadline for submission is August 8, at 11:59pm.

1. Chaudhuri et al. (2006): "Estimating the effects of global patent protection in pharmaceuticals: a case study of quinolones in India";
2. Fabrizio et al. (2007): "Do Markets Reduce Costs? Assessing the Impact of Regulatory Restructuring on US Electric Generation Efficiency";
3. Maccini and Yang (2009): "Under the Weather: Health, Schooling, and Economic Consequences of Early-Life Rainfall".

[1] Write-up should be done in LaTeX.

References

Adler, J. (2010): *R in a nutshell: A desktop quick reference*, " O'Reilly Media, Inc.". (Cited on 2)

Chaudhuri, S., P. K. Goldberg, and P. Jia (2006): "Estimating the effects of global patent protection in pharmaceuticals: a case study of quinolones in India," *The American Economic Review*, 96, 1477–1514. (Cited on 2)

Fabrizio, K. R., N. L. Rose, and C. D. Wolfram (2007): "Do markets reduce costs? Assessing the impact of regulatory restructuring on US electric generation efficiency," *The American Economic Review*, 97, 1250–1277. (Cited on 2)

Kabacoff, R. (2011): *R in Action*, Manning Publications Co. (Cited on 2)

Maccini, S. and D. Yang (2009): "Under the Weather: Health, Schooling, and Economic Consequences of Early-Life Rainfall," *American Economic Review*, 99, 1006–26. (Cited on 2)

Maindonald, J. and J. Braun (2006): *Data analysis and graphics using R: an example-based approach*, vol. 10, Cambridge University Press. (Cited on 2)

Matloff, N. (2011): *The art of R programming: a tour of statistical software design*, No Starch Press. (Cited on 2)

Miranda, M. J. and P. L. Fackler (2002): *Applied Computational Economics and Finance*, MIT Press. (Cited on 2)

Muenchen, R. A. and J. Hilbe (2010): *R for Stata users*, Springer. (Cited on 2)

Spector, P. (2008): *Data manipulation with R*, Springer Science & Business Media. (Cited on 2)

Teetor, P. (2011): *R cookbook*, " O'Reilly Media, Inc.". (Cited on 2)

Wickham, H. (2009): *ggplot2: elegant graphics for data analysis*, Springer Science & Business Media. (Cited on 2)

ECON890.04 Special Topics in Economics: Programming and Project Management

Summer 2017

Instructor: Chuhang Yin

Email: chuhang.yin@duke.edu

Office: Social Sciences 325C

Office Hours: by appointment

Classroom: Social Sciences 311

Class Times: M/W/F 1:00 pm – 3:00 pm

I. Overview

Unless you're very lucky, the one thing all research projects have in common is they require a lot of rework: adding or changing variables, selecting different samples, generating graphics, and running regressions with new sets of controls, among many other tasks. While the first and second-year classes cover the tools that you need for the big picture thinking for projects, they don't cover how to approach these reworking tasks that can consume a lot of your time.

In this class I hope to fill that gap by giving you techniques to set up a project and its code, so you can minimize the time it takes you to do mindless reworking task. Then you can devote more of that time to the big picture thinking that will advance your research.

While this course will focus on Stata, the same techniques can easily be adopted to Matlab and any other software packages you use. Some of the topics we will cover include:

1. Organizing your project files and structuring code.
2. Making your code easy to read, modify, and share.
3. Writing code to import and process raw data, generate summary statistics and graphics, and run regressions.
4. Tying this together in a file that will do all the analysis for your project in one click: from importing the raw data to exporting regression results.
5. Good project management practices when collaborating with others.

II. Requirements

This class is designed to teach you how to set up a project and code in a hands-on way, so we will often refer to the Stata interface, commands, and run segments of code during lectures. You'll also have a chance to work on and ask me questions about homework assignments, so I highly recommend bringing a laptop to class that has access to Stata.

To set up Stata on your computer, log into an interactive Stata session on the Econ Cluster or buy a Stata/SE annual license from OIT for $50. If you plan to work on campus most of the time, will

be working on projects with confidential data that has to be stored on a particular server, or won't be using Stata that often, the server should be fine. Otherwise, the license is worth considering.

Here are the general steps of setting up your computer to use Stata on the server:

1. Install software that will let your computer display the Stata windows generated by the server: X-Win32 or FastX if you're using Windows, or XQuartz if you're using a Mac.
2. Install an FTP client to transfer files to and from your workspace on the server. I recommend FileZilla.
3. Connect to the server using the software in 1 according to the guide by the department.

III. Class Schedule and Attendance

Weekly Topic	Monday	Wednesday	Friday
Setup & importing raw data	Introduction & motivation; Coding guidelines	Project setup; Creating a settings file; Simple file management	Advanced file management; Advanced data import
Generating datasets & summary stats	Combining datasets; Basic variable creation; Labeling variables & variable values	Reshaping data; Advanced variable creation	Generating, saving and exporting graphs; Methods for creating and exporting tables
Running regressions & collaborating	No Class on Aug 7	Defining multiple sets of regressors; Running and storing model estimates; Collaborating with others.	

IV. Assignments and Projects

I believe in learning by doing. So for this class we will be taking a scaled down version of the code that a former PhD student Brian Clark (now an economist at FTC) used for his research project and use it to create a cleaned dataset, generate summary statistics and graphics, and run regressions. But these techniques can be applied to other datasets.

An important goal of this class is to leave you with a template of how to organize your files and write the code for this type of project. I have broken down the process of generating this template into one short assignments for each of the eight classes. For the final project, I will give you a number of changes to make to your code and have you regenerate all the data, summary statistics, graphics and regression results. If you keep up with the lectures, it should be a breeze.

V. Grading and Attendance

I will assign three grades based on the following rubrics:

A. Code is complete and runs correctly on my computer without errors

B. Code is complete but runs with one or more errors

C. Code is incomplete or wasn't turned in on time.

You will have plenty of opportunities to correct and re-submit your code and ask me questions. I also encourage you to work on your code in groups. But you still need to turn in your individual assignments.

VI. Resources

1. University of Wisconsin Stata Programming Tools
2. The Stata help website
    a. Video tutorials
    b. Official documentation
    c. Visual overview for creating graphs
3. Princeton Stata tutorial
4. UCLA Stata overview
5. Marginal Revolution Stata resources
6. Two-page Stata

Economics 208D Fall 2015
Department of Economics
Duke University

INTRODUCTION TO ECONOMETRICS
Intuition, Theory and Applications

Instructor: Duncan Thomas
Office: 314 Social Sciences
Email: dthomas@econ.duke.edu

Lectures: Monday and Wednesday 11.45am – 1.00pm
Social Sciences 139
Office hours: Monday 1.15-3.15pm
Class web site: http://ipl.econ.duke.edu/dthomas/ec208d (or log on through sakai)

Graduate teaching assistants

Name	*Email*
Amanda Grittner	amanda.grittner@duke.edu
Veronica Montalva	veronica.montalva@duke.edu
Gina Turrini	gina.turrini@duke.edu
Chuhang Yin	chuhang.yin@duke.edu

Sections	*Day/time*	*Place*
01	Wednesday 4:55-5:45 pm	Soc Psych 127
02	Thursday 4:55-5:45 pm	Soc Psych 126
03	Thursday 1:25-2:15 pm	Soc Sci 111
04	Thursday 8:45-9:35am	Soc Sci 113

Attendance at lectures is required. Attendance at sections is very strongly recommended. Sections are led by PhD students who are experts in econometrics and have experience teaching the material in this course. In addition to sections, the TAs will hold office hours on Mondays and Tuesdays from 3:45 to 5:45 pm in Social Sciences 134.

Undergraduate teaching assistant

The class is also supported by an undergraduate teaching assistant, Victoria Lim, (victoria.lim.zhen.yi@duke.edu) who is available to assist you with material from the course and problem sets. Victoria will hold office hours from 12-1pm on Tuesdays in Social Sciences 134.

Examinations

There will be two examinations: a midterm and a final. Both examinations are required.

Midterm: *Monday October 5, 11.45am-1.00pm*
The in-class mid-term will be open book. You may bring any materials you need to the exam. You may not communicate with anyone inside or outside the room during the examination.

Final: *Tuesday December 8, 2.00-5.00pm*
The final will be closed book. You may bring *one two-sided 8.5"*11" page of formulae* that you construct and that you think will be of use to you during the exam. The sheet must be handed in with your exam.

If you have substantive questions about the course material, please see me during my office hours. Emailed questions about the material are very hard for me to answer effectively. It has been my experience that I typically need to know more about the problems you are encountering than you tell me in your email. In addition, I have no way to assess whether my e-mail response has cleared up the problem for you. I will, therefore, not attempt to answer substantive questions sent to me by email. If you cannot attend my office hours, we can make an appointment to meet at a time that is convenient for you.

Course Objectives

The goal of this course is to provide an introduction to both *the theory and application* of modern econometric methods to address questions in economics and the behavioral sciences. Mastery of the material is intended to provide you with sufficient knowledge of statistical and econometric methods to enable you to think critically when you evaluate the quality of evidence in support of a claim about how individuals behave, markets work, firms make money or societies operate. You will develop the skills to be an effective consumer and producer of empirical research in economics. Throughout the class, emphasis is placed on *intuitive understanding* of underlying concepts with more rigorous arguments serving to strengthen the foundation of your knowledge. Central concepts are illustrated with *applications*.

Course Requirements

You are required to have passed Probability and Statistical Inference (Stat 111). This class builds on the foundation laid in that class. Ideally you will have taken Stat 111in the semester immediately preceding this class or at least within the twelve months preceding enrolling in this class. It will be assumed that you have a good understanding of the material covered in Stat 111. With my permission, you may substitute Stat 130, 203, 250 Math 230 or 342 for Stat 111. In addition, it is assumed that you have a good grasp of calculus.

Building on the foundation laid in the pre-requisite classes, this class will begin with an introduction to the linear regression model. Core statistical concepts that you have covered in your statistics preparation will be applied to the regression model to provide a fuller understanding of the value of these tools to better understand economic phenomena and the world around us. This class will evaluate extensions to the linear regression model that are designed to address real world problems that arise in the study of economic behavior and provide rigorous tests of hypotheses in the economics and related literatures. In addition to understanding the theoretical concepts that underlie modern regression analysis, you should develop the practical skills necessary for good data analysis as well as learn how to interpret the results of your analyses. You will be required to do econometric analysis with real data from actual applications. You may use whatever computer hardware and software you like. Instruction will be provided for using STATA which you are strongly encouraged to learn. The product will serve you well in this class and other classes, research at Duke and beyond Duke. We will use STATA in this class. You may download a copy of STATA/SE for your own Mac, Windows or Linux computers. Instructions are on the class web site, http://ipl.econ.duke.edu/dthomas/ec208d/statalinks.html.

In addition, help using STATA is available in the Data and GIS lab in Perkins and at SSRI West. There are many good on-line resources, some of which are linked from the class web page.

Grading and Organization

Each week there will be two lectures. You are *required* to attend every lecture. Please turn off all phones, tablets, laptops etc. before class starts. Lectures will be supplemented by a weekly section which will cover statistical material that is not covered in this class and should have been covered in your pre-requisite class. You will be responsible for this material. Sections will also review lecture material, discuss problem sets and provide computer instruction. Each week, one TA will be responsible for all sections and the same material will be covered in every section that week. Attend the section for which you have signed up; if you want to change section, please check with the TAs so that we can ensure no section is too large to accommodate all students in the room.

All students are expected to understand and uphold the Honor Code, http://studentaffairs.duke.edu/conduct/about-us/duke-community-standard.

Problem sets

There will be a problem set every second week. The problem sets will help you understand important ideas in the theory and application of econometric methods and help you develop and interpret empirical evidence in a practical, real-world setting. To underscore the importance of taking the problem sets seriously, they will account for 28% of the final course grade. Completed problem sets must be submitted in person at the beginning of the lecture on the due date. Late problem sets will not be accepted. If you cannot hand in your problem set at the beginning of the lecture, with my prior consent, you can hand it in earlier. Problem sets must be handed in on paper, preferably typewritten. Emailed problem sets will not be accepted.

You may work with other students in this class on problem sets. By collaborating with your peers, my expectation is that you will more fully learn the material. Explaining an idea, concept, method or result to a peer is one of the best ways to reinforce your own understanding. However, to be sure that you do understand the work, *you must write up your own answers and submit your own work.* Please indicate on your problem set answers with whom you collaborated.

For each problem set, the grades will be 4 if your answer is, as far as we can tell, perfect; 3 if you appear to have a very good understanding of the material; 2 if your understanding is not as comprehensive as we would like and 1 if your answers indicate a weak understanding of the material. A grade of 1 is a signal to you that you need help. A very poor grasp of the material will be assigned a grade of 0. That indicates a very serious problem and you should seek help from the TAs or me immediately. Problem sets handed in late will get a grade of 0. The final problem set grade will be the average of all problem sets using the following conversions: 4 will earn 100%, 3 will earn 90%, 2 will earn 75% and 1 will earn 50%. 0 will earn 0%. This conversion scheme is designed to underscore the importance of making a good faith attempt to complete every problem set and submit it on time. Each problem set will be graded by one TA. If you have any questions, that TA will be the best person to review your answers after you have submitted your problem set. All questions about grades should be taken up with the TA who graded the problem set.

We will post answer keys on the class web page for each problem set soon after the submission deadline has passed. Each problem set will be reviewed in section. The section will not only go over the answers but also provide insights into how to think about the problems and thereby strengthen your understanding of the material. Given the size of the class, it is not possible to provide detailed written individual-specific feedback tor each student on his/her answer. More importantly from your point of view, it is also very difficult for us to identify every instance in which you do not understand something. It is, therefore, your responsibility to make sure you understand all the material covered in each problem set.

In-class quizzes

In-class quizzes will be administered to those attending lectures at randomly assigned times during the term. The quizzes are intended to assess your understanding of concepts covered in lectures up to that point and to provide feedback to you regarding your grasp of the material covered in the class. The in-class quizzes will account for 17% of the final grade. If you are absent from class, no matter what the reason, your grade for that in-class quiz will be zero.

Weekly discussion section

Each weekly discussion section will be led by a TA who is a PhD student. The TAs are experienced teachers who have expertise in econometrics. Sections will provide instruction in STATA, including classes on good programming and data management practices that will be helpful for other classes. Sections will review problem sets and extend ideas covered in the problem sets and review and reinforce material covered in this class or Stats 111.

Mid term exam

There will be a mid-term which will account for 10% of your course grade. The mid-term will be an open book examination. You may bring any books or materials you want to the class. You may not communicate with anyone inside or outside the classroom during the exam; this includes texting, emailing or any other form of electronic communication. There will be no make-up midterm. If you are unable to take the midterm, you must provide a written explanation *before* the mid-term. If the written explanation provides a reason that is clearly beyond your control, and I judge that it is appropriate to do so, then I will substitute your final grade for your midterm grade. In any other instances, your midterm grade will be zero.

Final exam

The final exam will be closed book and will cover all the material in the course. You do not need to memorize formulae for this class. You may bring one 8½*11 page of formulae with you for reference during the final exam; you may use both sides of the page. No other reference material is allowed. You may not communicate with anyone inside or outside the classroom during the exam; this includes texting, emailing or any other form of electronic communication. The final exam score will contribute 45% of the final grade for the course. If you miss the final exam for a reason that is outside of your control, with the approval of the Dean and if I judge that it is appropriate, you may be able to take the final exam the next time it is offered. In that case, I will substitute your grade in that exam for the final exam grade for this class after adjusting the grade so that the mean grade in both exams is the same.

Reading

The recommended text for this class is

Wooldridge, Jeffrey M. (2013) *Introductory Econometrics: A Modern Approach, 5th Edition,* Cengage

I encourage you to purchase this book. You may buy a paper or electronic copy. You do not need access to on-line resources. You may buy an earlier edition of the book.

If you find you do not like the presentation in Wooldridge's book, you might consider looking at:

Angrist J. and S. Pischke. (2014) *Mastering Metrics: The Path from Cause to Effect.* Princeton University Press.
Goldberger, A. (1998). *Introductory Econometrics*, Harvard University Press.
Gujarati, D. (2003), *Basic Econometrics*, Irwin-McGraw-Hill.
Hill, C., W. Griffiths, and G. Lim (2011). *Principles of Econometrics*, Wiley.
Stock, J and M. Watson (2011) *Introduction to Econometrics*, Pearson.
Studenmund, A. H. (2013) *Using Econometrics: A Practical Guide*. Pearson.

None of these books covers statistical theory in a comprehensive manner. If during the course you feel you need a statistical reference, you should refer to the text you used in your statistics course. The books that I recommend for background are:

Hogg, R. V. and E. A. Tanis. (1988). *Probability and Statistical Inference*, 2nd ed, MacMillan.

If you find that book tough, take a look at

Ben-Horim, M. and H. Levy (1984) *Statistics*, 2nd edition, Random House

In addition, I will provide handouts throughout the course to supplement the lectures and textbook.

I recommend that you peruse one or more of the following texts if you are having difficulty with particular topics or concepts.

Johnston, J. and J. Dinardo (1997) *Econometric Methods*, McGraw Hill.
Johnson, A., M. Johnson and R. Buse (1987), *Econometrics: Basic and Applied*, MacMillan. [HB139.J63]
Maddala, G. S. (1988), *Introduction to Econometrics*, McGraw-Hill. [HB139.M53]
Mirer, T. W. (1988), *Economic Statistics and Econometrics*, 2nd edition, MacMillan. [HB137.M57]
Pindyck, R. S. and D. L. Rubenfeld (1981), *Econometric Models and Econometric Forecasts*, 2nd edition, McGraw-Hill. [HB3730.P54]
Tukey, J. (1970), *Exploratory Data Analysis*, Addison-Wesley. [QA278.T84]
Wallace, D. and J. L. Silver (1987), *Econometrics*, Addison-Wesley. [HB139.W32]
Wonnacott, T. H. and R. J. Wonnacott (1984), *Econometrics*, 2nd edition, Wiley. [HA29.W654]

Mirer and Wallace and Silver provide a very accessible introduction to much of the material; Johnston and Dinardo, Johnson, Johnson and Buse, Maddala and Wonnacott and Wonnacott are more advanced. Tukey is the best source for exploratory data analysis methods which are not well discussed in the other texts.

Course Outline and Required Reading

Readings from Wooldridge are required. They are intended to complement the lectures and I encourage you to read the appropriate chapters before class.

		Wooldridge
1.	*Introduction to econometrics*	Chapters 1 and 19
2.	*Simple linear regression model*	Chapter 2, 9.5, 9.6
3.	*Fundamentals of multiple regression*	Chapter 3, 9.2 9.3, 9.4
4.	*Theory of estimation and inference*	Appendices B and C
5.	*Linear regression model: Inference*	Chapter 4, 5
6.	*Linear regression model: Interpretation*	Chapter 6
7.	*Indicator variables*	Chapter 7
8.	*Non-spherical errors: Heteroskedasticity and correlated errors*	Chapter 8
9.	*Limited dependent variable models*	Chapter 17
10.	*Omitted variables and sample selectivity*	Chapter 9
11.	*Instrumental variable estimation and two stage least squares*	Chapters 15 and 16
12.	*Panel data methods*	Chapters 13 and 14
13.	*Time series methods*	Chapters 10, 11 and 12

If, after class, you have difficulty with the lecture notes and Wooldridge's presentation, you should consult one of the alternative texts. They are listed, with chapter references, below. Alternative readings are identified only to assist you and are not required.

Alternative readings

Sections 1, 2 and 3: Introduction to regression model

Angrist and Pischke	Chapters 1 and 2
Goldberger	Chapters 1 and 2
Gujarati	Chapters 1, 5 and 6
Hill, Griffiths and Lim	Chapters 1, 2 and 4
Stock and Watson	Chapter 1

Section 4 : Theory of estimation and inference

Goldberger	Chapters 2-4
Gujarati	Chapters 2, 3
Hill, Griffiths and Lim	Chapters 1P, 3
Stock and Watson	Chapters 2-3

Section 5, 6 and 7: Classical multiple regression model

Angrist and Pischke	Chapter 2
Goldberger	Chapters 6 -12
Gujarati	Chapters 7-9
Hill, Griffiths and Lim	Chapters 5-7
Stock and Watson	Chapters 4 -7

Sections 8, 9 and 10: Relaxing assumptions of the regression model

Goldberger	Chapters 13-17
Gujarati	Chapters 10-14
Hill, Griffiths and Lim	Chapter 8
Stock and Watson	Chapters 8, 9 and 11

Sections 11 and 12: Unobserved heterogeneity and instrumental variable methods

Angrist and Pischke	Chapter 3
Goldberger	Chapters 18 and 20
Gujarati	Chapter 15
Hill, Griffiths and Lim	Chapters 10-11
Stock and Watson	Chapter 12

Section 13: Panel data methods

Angrist and Pischke	Chapter 5
Gujarati	Chapters 10, 11 and 12
Hill, Griffiths and Lim	Chapter 15
Stock and Watson	Chapter 10

Section 14: Time series methods

Goldberger	Chapters 13 and 15
Gujarati	Chapters 10, 11 and 12
Hill, Griffiths and Lim	Chapter 9
Stock and Watson	Chapters 14-16

ECON345 Urban Economics[1]

Duke University

Fall 2019

Instructor: Chuhang Yin

Email: chuhang.yin@duke.edu

Office: Social Sciences 325C

Office Hours: Tu/Th 1:25 – 2:40 pm

Lectures: M/W 1:25 pm – 2:40 pm, Social Sciences 311

Course Summary

This course will focus on the role of cities in the theory of practice of economics. it will make use of microeconomic and statistical analysis at the intermediate level and will incorporate real-world policy examples. The class will be divided into three parts. Part I will introduce the core theories in urban economics on urban structure, firm and household location choices, hedonic valuation and location equilibrium. Part II will focus on the empirical techniques used by economists to evaluate the value of urban infrastructure and implement place-based policies. Part III will discuss miscellaneous topics in urban transportation crime, pollution, and quality of life measurement.

Requirements

The following are required for successful completion of the course: (1) a series of problem sets and short written assignments covering concepts presented in class; (2) three short papers (4 pages, double spaced, including graphs and references) on urban topics; (3) a midterm exam; (4) a final exam. We will also have a few in-class activities that are intended to keep things from getting boring. These activities work the best if everyone comes to class prepared and actively participates. Finally, there will be opportunities for participation in lectures. Class participation may be used to decide borderline grades.

Prerequisites:

Required: Intermediate Microeconomics (ECON 201D).

Recommended: one course in statistics/econometrics.

[1] This syllabus is adapted from the Urban Economics course (ECON414) by Professor David Albouy (UIUC).

Grading

Grades will be determined based on the following allocation:

Problem Sets & Writing Assignments	25%
Short Papers	25%
Midterm Exam	25%
Final Exam	25%

Short Papers

You will be required to complete three short papers (each no more than 4 pages in length, double spaced, including graphs and references). Two of the papers should be based on news reports taken from the following radio shows, podcasts or blogs (current or archived). You do not have to listen to the shows live – all their content (current and archived) is available on the Internet:

- http://www.npr.org/programs/morning-edition/
- http://www.npr.org/programs/all-things-considered/
- http://greeneconomics.blogspot.com/
- https://www.urban.org/urban-wire
- https://www.probablecausation.com/ (emphasis on crime)
- https://www.theigc.org/blog/ (emphasis on developing countries)

The stories that you choose should be connected to an urban topic covered in class. The rubric for grading will be as follows:

(1) Explain the policy context of the story. What is the story about? (1-5 points)
(2) Relate the story to an analytical structure used in a class lecture. You must use at least one figure or equation, and it must be properly labeled and easy to understand. (1-5 points)
(3) Clear and concise writing. (1-5 points)

The topic of the second paper must be different from that used for the first. A detailed rubric will be distributed in class. You can cite other sources when you find them helpful.

The third short paper will be a "policy brief". It should also be no more than four pages in length (double spaced, including figures and references). I will provide you with a list of current policies, e.g. rent control. You will need to:

- Summarize the goals of the policy
- Describe details of implementation
- Tie policy to an analytical structure used in class
- Discuss the politics of the policy.

The due dates for the short papers will be announced in class (approximately one paper due per month).

Attendance

Attendance will not be tracked, and you are not required to inform the instructor when you will miss a class. Please find out (either from the instructor or another student in the class) what you missed and get the relevant notes. Lectures are posted on the course Sakai site.

Do let the instructor know if you are going to miss class on the day of a scheduled in- class activity or on the date of the midterm exam. It is important to have a headcount when planning an in-class activity, and we can arrange a make-up time for the midterm exam if it is an excused absence (e.g., sickness, varsity athletics). We can also work around absences caused by job interviews.

The final exam will be held during the normal exam period at the time designated by the Registrar. You should keep this in mind when purchasing airline tickets.

Late Assignments

Due dates for assignments are posted on the syllabus. Reminders will be emailed three days before the assignments are due. Late work will not be accepted.

Readings

The required textbook for the class (available online from Duke Library) is

- Brueckner, Jan K. *Lectures on Urban Economics*

Additional references are:

- O'Sullivan, Arthur. *Urban Economics*.
- McDonald, John and McMillen, Daniel. *Urban Economics and Real Estate: Theory and Policy*.
- Glaeser, Edward. *Triumph of the City*.
- Nicholson, Walter. Microeconomic Theory: Basic Principles and Extensions.

There will be other readings (book chapters, journal articles, etc) presented throughout the semester on the course Sakai page.

Course Outline

Part I: Key Theories in Urban Economics

1) Introduction to Urban Economics (3 Lectures)

8/22 Definition and scope of urban economics. Olympics.

8/24 Urban history: from Babylon to Tokyo. "Urban giants" and centralized power.

8/29 Density, urbanization, and the definition of a city and metropolitan area; political districts. Zoning.

2) Theory of Households, Firms, and Location Decisions across Cities (3 Lectures)

8/31 Microeconomic Review: households with local and tradable goods; housing demand, price and income elasticity; indirect utility functions, cost-of-living index and an affordability index.

9/7 Microeconomic Review: firms with fixed and variable inputs, labor demand, housing supply, unit cost functions.

9/12 Theory of locational equilibrium across cities and neighborhoods. Compensating differentials.

3) Hedonic Analysis of Rents and Wages, Segregation and Discrimination (2 Lectures)

9/14 Rent: housing characteristics, and location across and within metropolitan areas. Housing segregation by race, income, and other characteristics.

9/19 Wages: education, experience, race, gender, and location. Theory and evidence of discrimination.

4) Urban Land Rent and Land-Use Patterns (2 Lectures)

9/21 The traditional mono-centric city model. Closed and open cities.

9/26 Micro-foundations of urban costs. Bid-rent curves for households, offices, and manufacturing, and cities as a whole.

*****Midterm Exam on sections (1)-(4), scheduled in class on Wednesday, September 28*****

Part II: Empirical Tools in Urban Economics

5) Agglomeration, Urban Growth, Place-Based Policy, and City Size (4 Lectures)

10/3 Advantages of urbanization: learning, matching, and sharing.

10/5 Economic base theory and the multiplier; Do local economic development programs benefit locals? Are sports teams and stadia that great for local economic development? Model Cities and Empowerment Zones

10/10 Federal tax and transfer policy across cities and regions. Land taxes and Henry George.
10/12 Welfare benefits of urban migration in developed and developing countries.

6) Empirical Analysis of Cities (2 Lectures)

10/17 Measuring the value of specific amenities: safety, schools, activity. Benefits of public infrastructure investment.

10/19 The amenity costs and benefits of climate change by area. Housing productivity and the costs and benefits of land-use regulation

7) Inside the City: Local Government, Neighborhood Choice (2 Lectures)

10/24 The Tiebout model of local public goods, sorting, and benefit taxation; fiscal zoning 11/2 Suburbanization and sprawl; tipping points and "flight from blight."

11/26 Suburbanization and sprawl; tipping points and "white flight".

8) Housing Prices and Housing Supply (2 Lectures)

10/31 What makes housing special? Determinants of housing supply and demand. Urban decline and durable housing.

11/1 The user cost of housing: capital costs and gains, maintenance, depreciation, and taxes. Owning versus renting. Housing price indices, price-rent ratios.

9) Housing Policy and Urban Poverty (2 Lectures)

11/7 Rent control and its unintended consequences. Public housing, housing vouchers, and low-income housing tax credits

11/14 Neighborhood effects, peer effects, and broken windows. Spatial mismatch. Housing supply restrictions and exclusionary zoning. Inclusionary zoning. Moving to Opportunity experiment. Social mobility and neighborhoods.

Part III: Transportation, Crime, Pollution and Quality of Life

10) Urban Transportation (2 Lectures)

11/17 Commuting patterns and modes of transportation. Private commuting costs Automobiles and externalities from congestion, pollution, accidents, and other sources

11/28 Optimal congestion tolling; mass transit. Bus Rapid Transit systems in developing countries.

11) Crime, Pollution, and Quality of Life (2 Lectures)

11/30 The rise and fall of urban crime – can we explain both? Recent research on urban interventions to reduce crime, e.g. street lighting in NYC.

12/5 The costs and benefits of climate change. Measuring quality of life across cities.

12/7 Final Exam Review

*****CUMULATIVE Final Exam on all topics covered, time TBA by Registrar*****