PKU–UChicago International Policy Action Lab (IPAL)
Sample Syllabus

Instructors

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Curriculum

This program is an introduction to international policy, data analytics, and research design. We will focus on establishing a foundation for studying public policy problems through data. This program consists of two complementary sections – Applied Econometrics and Programming in Stata, one capstone research project, and one optional section – Introduction to Programming in R.

Applied Econometrics [AE], taught by Peking University, focuses on econometrics methodology and its applications. In this section, you will be provided with a comprehensive understanding of the econometric modeling tools that are frequently used in empirical economic research.

Programming in Stata [Stata], taught by Peking University, introduces you to basic functions with the programming language Stata. In this section, we will demonstrate and interpret the econometric models covered in the AE course by Stata, including linear regression, instrumental variable estimation, maximum likelihood estimation, panel data models, and limited dependent variable models etc. In addition, we will further discuss the causal inference methods commonly used in empirical research, such as difference in difference (DID), matching, and regression of discontinuity (RDD).

Capstone Research Project, led by the University of Chicago, enables you to collaborate with faculty and a group of peers on a real-world problem and design a policy recommendation. The project hours are approximately 15-20.

You will harness the skills of research design, policy analysis, and team collaboration to conduct a research project using open-source or faculty-provided datasets. There are elements of data collection, analysis, and visualization, and result in a policy memo.

Project topic is determined during the program. Professor Wright presents three-four project topics, and students vote to select one preferred topic. You will collaborate with peers in small groups (your "capstone peer group") on the topic. The skills gain in the project are transferable for further research in your area of interest.

Introduction to Programming in R [R], taught by the University of Chicago, introduces students to the powerful statistical modeling software known as R. This is a free and open-source software that is constantly being expanded and upgraded. Knowledge of programming in this language is in high demand in policy job markets. In this section of the course, you will be introduced to many of the key uses of the software – including data wrangling, applications of causal inference methods, data visualizations, and more.

Virtual Format

Live lectures for Applied Econometrics and Programming in Stata will be conducted in Zoom.

The Capstone Project is combination of live lecture and interactive working sessions with Professor Wright, teaching assistants, and capstone peer group.

Academic lectures for R Programming are delivered via weekly video modules (pre-recorded lectures). These modules will provide students with the knowledge and materials to understand the basics of data analytics as applied to public policy.

Office hours are held multiple times throughout each week, enabling students the connect with faculty and teaching assistants. Office hours are scheduled based on the current cohort of students as we accommodate the global time zones and work schedules.

Course Materials

All necessary course materials will be made accessible via the course canvas page. There are no required textbooks.

For Applied Econometrics and Programming in Stata, *Microeconometrics: Methods and Applications* by A. Colin Cameron and Pravin K. Trivedi and *Microeconometrics Using Stata (2nd Edition)* by A. Colin Cameron and Pravin K. Trivedi are recommended.

If you would like a supplementary text that covers many of the same topics, then *R for Data Science (R4DS)* by Hadley Wickham and Garret Grolemund's is recommended for Programming in R. This online textbook is free. A recommended, not required, read is *Thinking Clearly with Data: A Guide to Quantitative Reasoning and Analysis* by Ethan Bueno de Mesquita and Anthony Fowler.

Assignments and Grading

The assignments will consist of reading assignments and computer lab assignments. Each assignment will be released via canvas. Details of points per assignment and assignment due dates are available in the Canvas Syllabus. The Capstone Research Project is graded separately. Please refer to Capstone Syllabus.

Schedule

Optional Pre-Program Course: Introduction to Programming in R	
July 4-17, 2022	0 - Course Preview 1 - Intro to R and RStudio (working dirs, projects, panes, R basics, etc) 2 - Intro to tidyverse, fundamentals of data, basic visualization 3 - Tidy data, data wrangling, and simple data cleaning 4 - Recoding, data transformation, and joins (plus more wrangling) 5 - Data visualization and exploration (ggplot2, summarization) 6 - APIs and policy applications (working with Census data) 7 - Programming concepts (for loops, functions, control flow) 8 - Causal inference stats in R (lm, sample, distributions, stargazer) 9 - Introduction to spatial data (sf, tmap, ggmap) 10 - Literate programming (RMarkdown, code syntax), GitHub
Applied Econometrics	
Week 1	1.1 - Introduction 1.2 - Ordinary Least Squares 1.3 - Generalized Least Squares 1.4 - Maximum Likelihood Estimation and Hypothesis Testing 1.5 - Time Series Models
Week 2	1.6 - Models of Pooled Cross-sections and Panel Data 1.7 - Endogeneity and IV Estimation 1.8 - System of Regression Equations 1.9 - Discrete Choice Models 1.10- Tobit and Selection Models
Programming in Stata	
Week 3	1.1 - Introduction to Stata 1.2 - Linear Regressions in Stata 1.3 - Non-linear Regressions in Stata 1.4 - Casual Inference Strategies (I) 1.5 - Casual Inference Strategies (II)
Capstone Research Project	
Weeks 4 & 5	3.1 - Capstone Project Kick-off Meeting 3.2 - Policy Memo Writing Workshop 3.3 - Capstone Working Group 3.4 - Capstone Mid-cycle Check Meeting 3.5 - Capstone Presentation Summit

Credential Award

Upon successful completion of the coursework, participants will receive a Certificate of Completion, issued electronically, upon successful completion of the credential program.

Certificate of Credential Completion, issued by the Harris School of Public Policy and Peking University, contains a grade for each academic component: Applied Econometrics, Programming in Stata, and Capstone research project. If you take the optional course R Programming, the grade will also be contained. You will receive an email from our office (harriscredential@uchicago.edu) with the electronic certificate approximately four weeks after the program.

University of Chicago Academic Integrity Policies:

All students are expected to uphold the highest standards of academic integrity and honesty. Among other things, this means that students shall not represent another's work as their own, use un-allowed materials during exams, or otherwise gain unfair academic advantage.

The University's policies regarding academic integrity and dishonesty are described here and below:
"It is contrary to justice, academic integrity, and to the spirit of intellectual inquiry to submit another's statements or ideas as one's own work. To do so is plagiarism or cheating, offenses punishable under the University's disciplinary system. Because these offenses undercut the distinctive moral and intellectual character of the University, we take them very seriously. Proper acknowledgment of another's ideas, whether by direct quotation or paraphrase, is expected. In particular, if any written or electronic source is consulted and material is used from that source, directly or indirectly, the source should be identified by author, title, and page number, or by website and date accessed. Any doubts about what constitutes "use" should be addressed to the teaching fellows."

Much of this class will be spent coding in Stata or R. We encourage using online resources and discussion boards such as Stack Exchange. Code you find online should be referenced via a link to where you found the solution to your problem. Cite all code you copy, even if just a single line snippet. You may screen share your code with your peers, but do not copy each other's code. All work you turn in must be your own and copying code will be considered a violation of the terms of academic honesty.

Please see The University of Chicago Student Manual: https://studentmanual.uchicago.edu/Policies.