LS 88 - Behind the Curtain in Economic Development
Data Science 8 Connector Course – Fall 2017

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Meeting Time: Monday 2-4
Location: Cory 105
Office Hours Time: Tuesday 2-3 (email for other times)
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Description: The purpose of this class will be to give students hands on experience looking at how data is gathered for analysis, and to provide context for the use of data for studying applied issues in economic development. The background will be a set of policy questions from a field study in rural Kenya, on child health and clean drinking water. The class will review the recent evolution in development economics that apply Randomized Evaluations to test the efficacy of different types of policies. The class will look at methods in sampling, surveying, and data collection. The students will use their data analysis tools to start to look at questions about household behavior and how households are situated in local, regional and national contexts.

The field study from rural Kenya offers examples for study of technology adoption, human health behaviors, and community vs individual interventions. Amongst the thematic areas covered will be: Millenium Development Goals, Water, Sanitation and Hygeine (WASH), evolution of international aid giving, aspects of epidemiology, and the economics in public health. The topic also covers Development Engineering, through innovating, deploying, and testing products for people in poverty. The programming component will look at data visualization and statistical inference with a view to understanding the sources of the data.

Prerequisites: It is assumed that students are concurrently enrolled in Data 8

Textbooks: Poor Economics, Abhijit Banerjee and Esther Duflo, 2011, Public Affairs
Running Randomized Evaluations, Rachel Glennerster and Kudzai Takavarasha, 2013 Princeton University Press

Other Readings: other readings will be posted or linked to on the bcourses website, including the surveys and journal articles that accompany the data we work on.

Grading: Labs (60%) Final paper (30%) Class Participation (10 %)

Final Paper: at the end of the semester students will prepare a five page paper summarizing and describing some original research results from the datasets we look at during the class and in the labs. Students will prepare tables and graphs from the datasets used in the lab notebooks. Further instructions will be provided at the end of the semester

Class time: The class time will be used as a combination of lectures, discussions, and computer time. Students are expected to participate in discussion and to come prepared with having read and reviewed the outside materials. Class time can also be used to look over the Labs.

Labs: The class assignments will be based on a set of 8 Jupyter notebooks that will run on the datahub.berkeley.edu server. Each notebook will have some combination of programming and space to write up your interpretation and analysis of the data. The Labs will be saved as Pdf and submitted to bspace by Friday night of the week they are assigned.

Mobile Phones: I really don't like to see mobile phones while I am talking.

Scheduling Conflicts: Please notify me in writing by the second week of the term about any known or potential extracurricular conflicts (such as religious observances, graduate or medical school interviews, or team activities). I will try my best to help you with making accommodations, but cannot promise them in all cases.

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Honor Code : UC Berkeley's honor code states "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others"

Academic Integrity: You are a member of an academic community at one of the world's leading research universities. Universities like Berkeley create knowledge that has a lasting impact in the world of ideas and on the lives of others; such knowledge can come from an undergraduate paper as well as the lab of an internationally known professor. One of the most important values of an academic community is the balance between the free flow of ideas and the respect for the intellectual property of others. Researchers don't use one another's research without permission; scholars and students always use proper citations in papers; professors may not circulate or publish student papers without the writer's permission; and students may not circulate or post materials (handouts, exams, syllabi--any class materials) from their classes without the written permission of the instructor.

Any test, paper or report submitted by you and that bears your name is presumed to be your own original work that has not previously been submitted for credit in another course unless you obtain prior written approval to do so from your instructor. In all of your assignments, including your homework or drafts of papers, you may use words or ideas written by other individuals in publications, web sites, or other sources, but only with proper attribution. If you are not clear about the expectations for completing an assignment or taking a test or examination, be sure to seek clarification from your instructor beforehand. Finally, you should keep in mind that as a member of the campus community, you are expected to demonstrate integrity in all of your academic endeavors and will be evaluated on your own merits.

Collaboration and Independence: Reviewing lecture and reading materials and studying for exams can be enjoyable and enriching things to do together with one's fellow students. We recommend this. However, homework assignments should be completed independently and materials turned in as homework should be the result of one's own independent work.

Plagiarism/Self-plagiarism: You must be original in composing the writing assignments in this class. To copy text or ideas from another source (including your own previously, or concurrently, submitted course work) without appropriate reference is plagiarism and will result in a failing grade for your assignment . For additional information on plagiarism, self-plagiarism, and how to avoid it, see, for example:http://www.lib.berkeley.edu/instruct/guides/citations.html#Plagiarism(link is external)http://gsi.berkeley.edu/teachingguide/misconduct/prevent-plag.html(link is external)

1. ACCOMMODATION OF RELIGIOUS CREED In compliance with California Education Code, Section 92640(a), it is the official policy of the University of California at Berkeley to permit any student to undergo a test or examination, without penalty, at a time when that activity would not violate the student's religious creed, unless administering the examination at an alternative time would impose an undue hardship that could not reasonably have been avoided. **Requests to accommodate a student's religious creed by scheduling tests or examinations at alternative times should be submitted directly to the faculty member responsible for administering the examination by the second week of the semester.** Religious Creed section of the Academic Calendar Webpage: http://registrar.berkeley.edu/DisplayMedia.aspx?ID=Religious%20Creed%20Policy.pdf

2. CONFLICTS BETWEEN EXTRACURRICULAR ACTIVITIES AND ACADEMIC REQUIREMENTS The Academic Senate has established Guidelines Concerning Scheduling Conflicts with Academic Requirements to address the issue of conflicts that arise between extracurricular activities and academic requirements. These policies specifically concern the schedules of student athletes, student musicians, those with out-of-town interviews, and other students with activities (e.g., classes missed as the result of religious holy days) that compete with academic obligations. **It is the student's responsibility to notify the instructor(s) in writing by the second week of the semester of any potential conflict(s) and to recommend a solution, with the understanding that an earlier deadline or date of examination may be the most practicable solution.** It is the student's responsibility to inform him/herself about material missed because of an absence, whether or not he/she has been formally excused. http://teaching.berkeley.edu/checklist-scheduling-conflicts-academic-requirements

Academic Senate Policies regarding extracurricular conflicts: http://academic-senate.berkeley.edu/sites/default/files/committees/cep/guidelines_acadschedconflicts_final_2014.pdf

3. ABSENCES DUE TO ILLNESS Instructors are asked to refrain from general requirements for written excuses from medical personnel for absence due to illness. Many healthy people experience a mild-to-moderate illness and recover without the need to seek medical attention. University Health Services does not have the capacity to evaluate such illnesses and provide documentation excusing student absences. However, UHS will continue to provide documentation when a student is being treated by Tang for an illness that necessitates a change in course load or an incomplete. Academic Senate Policies regarding absences due to Illness: http://academic- senate.berkeley.edu/committees/coci/toolbox#16

4. ACCOMMODATION FOR DISABILITY Information about a student's disability is confidential, and will not be shared with other students. Please contact me regarding your specific needs, which will be accommodated in line with the Disabled Students' Program: Plan for Accommodating Academic Needs http://www.dsp.berkeley.edu/accommodationpolicy

5. ACCOMMODATION FOR PREGNANCY AND PARENTING In compliance with Title IX of the Education Amendments of 1972, and with the California Education Code, Section 66281.7, it is the official policy of the University of California at Berkeley to not discriminate against or exclude any person on the basis of pregnancy or related conditions, and to provide reasonable accommodations to students as appropriate. Instructors are reminded of their responsibilities for excusing medically necessary absences for pregnancy and related conditions and making reasonable accommodations in the areas of class sessions, exams, tests, project deadlines, field trips, and any other required activities. For graduate students, faculty advisors are reminded of policies regarding parental leave and the extension of normative time for academic milestones, as set out in the Guide to Graduate Policy.

Reasonable common sense, judgment and the pursuit of mutual goodwill should result in the positive resolution of conflicts. The regular campus appeals process or Title IX complaint process apply if a mutually satisfactory arrangement cannot be achieved. Office for the Prevention of Harassment and Discrimination: http://ophd.berkeley.edu/

Date	Topic	Class	Reading	Lab
8/28	Intro	Evolution of Statistics, Economics, and now Data Science. How to spend money efficiently, how to understand human behavior, how to save human lives. Applied skepticism. Academic publication process.	Poor Economics **1,2** Running Randomized Evaluations **1**	
9/4	{Labor Day}			
9/11	Water and Sanitation, MDGs Rural Kenya	Motivation on Diarrhea and Child Health. Millennium Development Goals. Wells, Pumps, Protecting Springs, Jerrycans, WaterGuard, other POU products. Research setting in Western Kenya	Banerjee and Duflo 3 Running Randomized Evaluations **2**	Lab 1 - Make a map of spring sites and dispenser sites in Kenya
9/18	RCTs – Control and Treatment – Arms of study	Randomized Evaluation in Development Economics. CEGA at Berkeley and Berkeley professors. Designed vs natural experiments. Efficacy vs. effectiveness. Survey of key areas of research. Clinical Trials and Human Subjects Registration.	Running Randomized Evaluations **3,4**	Lab 2 - Lab on treatment arms – are arms balanced?
9/25	Innovation – Blum Center, evaluation of take-up, informing design process	Design Engineering, Development Engineering, Big Ideas, Blum Center Projects, Evaluation metrics, scale up, iteration into design process.	Running Randomized Evaluations **5**	
10/2	Surveys: Design of surveys, data collection	Survey design and some elements. Training of surveyors and testing of instruments. Outcome variables for water testing, chlorine testing. Variable names, data entry, skip patterns.	Read surveys – SIP, WGP and BWM surveys on Bspace	Lab 3 – Transform key variables
10/9	Data Capture and cleaning – databases, spreadsheets	Workflow of data entry and data capture might look like. Paper based approaches / tablet & digital based approaches. Data validation. Research Transparency and Pre-Analysis Plans		
10/16	Water Quality examples of outcome variables.	Variability and sample testing. Ecoli as a proxy for cause of diarrhea. Problems in testing biological samples. Sampling issues. Microbiology vs Economics		Lab 4 - data on ecoli in springs & household from BWM
10/23	Spring Cleaning Project	Overall design and findings of Spring Treatment project, treatment arms / waves / sample sizes. Outcomes found and design of follow-on studies	*Spring Cleaning* Paper:	Look at SIP dataset

10/30	Water Guard Promotion – How to increase use of chlorine, coupons and price, promoters	More intensive study of how to promote household Chlorine use. Motivational Scripts, Promoters paid flat fee vs. incentivized, coupons for discounted use.	*Social Engineering* Paper :	Lab 5 - WGP dataset – baseline
11/6	Dispensers – innovation of the idea – point of collection	Process of invention of Dispensers, How to make it the most convenient treatment arm. New paradigm of point of collection treatment. Peer effects of seeing each other use it. Scaling and Adapting the approach out of a study.		Lab 6– 3wk and LTF
11/13	Diarrhea BWM – need to do high frequency data with recall	Structure of BiWeekly Monitoring survey. Recall of data. Diarrhea measurement issues. Trends over time.	Running Randomized Evaluations **9**	Lab 7 - BWM part 1
11/20	Hawthorne Effect of the frequency of being surveyed	Adding in an extension sample infrequently surveyed. Interruption of election violence. Impact on WG use. Impact on ORS use.	*Being Surveyed* Paper	Lab 8 - BWM part 2
11/27				
11/4	Cost Effectiveness of Aid	Evidence Action and scaling the Chlorine Dispenser project, and scaling Deworm the World. GiveWell website and research. Malaria bednets example, Nothing but Nets. Carbon financing and auditing.	Banerjee and Duflo **10** Running Randomized Evaluations **9**	
11/11	Exam Week			Write a 5 page paper illustrated with tables and graphs from original data analysis