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Political Science Math Camp 2024

Workshops begin Sept 3

Math Camp 2024

UCLA

Department of Political Science

WORKSHOP SCHEDULE (https://bruinlearn.ucla.edu/courses/195999/pages/workshop-schedule)

ZOOM link for Workshops (https://ucla.zoom.us/my/gpstraus)

Welcome to Poli Sci Math Camp! The goal of Math Camp is to prepare incoming Ph.D. students for the first year of the Pol Sci Methods Sequence (PS 200A, 200B and 200C.) We will cover the topics in algebra, calculus, and linear algebra that you will need to learn the statistical methods used in social scientific research. Math Camp involves video lessons, online quizzes and practice problems. **There will be synchronous online meetings at noon Pacific Time every Tuesday, Thursday and Friday, beginning Tuesday 9/ 3 to Tuesday 9/24. All meetings will be on Zoom (https://ucla.zoom.us/my/gpstraus) .** You do not need to be in Los Angeles to participate - but we will try to arrange a meetup or two if you are.

Math Camp follows the “flipped classroom” model. You will watch pre-recorded lectures on your own time, then come together to work on problems in groups (thus “flipping” the traditional model of coming together to passively listen to a lecture then working problems on your own.) Course materials are available on the match camp website. Video and lecture notes for Module 1 are publicly accessible, but you will need to officially join the class to access quizzes and participate in the Zoom meetings. If you have not received an invitation to join the website, email **gpstraus@gmail.com (mailto:gpstraus@gmail.com)** .

Math Camp gives no university credit. It will not show up on your transcript. There are no grades. It is just about learning and reviewing the math you need to succeed as a Ph.D. student in the social sciences.

To gain access to Math Camp materials:

*1. Go to **BruinLearn Main Page** and log in with your UCLA credentials. This will register you with the BruinLearn system.*

*2. Email **gpstraus@gmail.com (mailto:gpstraus@gmail.com)** to request an invitation (I won't be able to send the invitation until you do.)*

Instructors

Math Camp was designed by Professor Kathy Bawn, who has taught first-year graduate methods classes at UCLA since joining the Political Science Department in 1991. She has studied the politics of coalitions in a variety of contexts, concentrating in recent years on political parties in the United States.

Math Camp 2024 Workshops will be led by Instructor Graham Straus, a Ph.D. student in the Political Science department.

For questions, contact Graham at **gpstraus@gmail.com (mailto:gpstraus@gmail.com)** .

Module 1: Pre-Math Camp/Self Study

Module 1 is a self-study on-ramp to help students get ready for Math Camp itself. This module provides an overview of basic algebra topics: simplifying and solving equations, exponents, factors, fractions, inequalities and summation symbols. While these topics are basic, they can nonetheless be challenging if you have been away from math for a while. Module 1 is set up for you to work through on your own, at your own pace. Each lesson in Module 1 has video lectures, written notes, an online quiz, and a set of practice problems with answers provided. There are no workshops or other synchronous meetings for Module 1

If you know you're comfortable with algebra (e.g., if you used mathematics regularly in your college coursework), you can probably skip Module 1. If you're not sure, try working some of

the practice problems in Lesson 1-e, check your answers, and review topics as necessary.

Module 1 Workflow

If you know you want/need a solid review of this material, then you should **work through Module 1 systematically, ideally before the Math Camp Workshops start on September 1.** For each lesson:

1. Watch the videos and/or go through the notes. Be sure to take your own handwritten notes as you watch/read!
2. Take the quiz right after watching/working through the lectures. The quiz will help you consolidate the information you've just studied.
3. Work through the practice problems, checking your answers.

PACE YOURSELF: If you're not already comfortable with the Module 1 topics, you'll probably need 2-4 work sessions of 1-2 hours each to work through each of the six lessons. For example, you might plan one session to work through the videos and take the quiz, then another 1-3 sessions to do all the practice problems. You're much better off scheduling short (1-2 hour) sessions every day than spending long blocks of time less frequently.

Even though Module 1 is set up for self-study, you are welcome -- encouraged, really! -- to reach out to each other, to work together on practice problems, and to contact Graham with questions.

The course Discussion Board is a great way to do this – you can post questions, or just introduce yourself.

Modules 2-10: Math Camp

Modules 2-10 cover the traditional Math Camp topics – functions, calculus, matrix algebra. As with Module 1, there will be video lectures with notes, online quizzes and practice problems. But now we will add more elaborate and interesting Workshop problems for you to work on together via Zoom.

Workshops are scheduled for Tuesday, Thursday and Fridays, noon-2pm Pacific Time, beginning Tuesday 9/3. If you cannot attend Workshops as scheduled, you should try to solve the Workshop problem on your own, using the posted answers to check your work.

Schedule of Workshop Topics

Tues	9/3	Intro + Using Algebra (Module 2a)
Thurs	9/5	Using Algebra 2 (Module 2b)
Fri	9/6	Functions (Module 3)
Tues	9/10	Limits and Derivatives (Module 4)
Thurs	9/12	Finding Derivatives (Module 5)
Fri	9/13	Optimization (Module 6)
Tues	9/17	Integrals (Module 7)
Thurs	9/19	Matrix Algebra (Module 8)
Fri	9/20	Matrix Inverse (Module 9)
Tues	9/24	Multivariate Calculus (Module 10)

** Meetings scheduled for noon-2pm PT

Math Camp Workflow

In order to participate in each of the above Workshops, you will need to

1. Watch the videos and/or work through the lecture notes. Take notes by hand to make sure that you are following the material.
2. Take the online quiz to consolidate the module material.
3. Do some practice problems -- maybe before the workshop, maybe after. The practice problems are mostly easier than the Workshop problems we will do together. Solving them in advance will help you participate actively in Workshop. That said, it's fine to save some practice problems to consolidate skills after the Workshop.

At the end of each week (before Friday midnight), upload your practice problems and

Workshop answers using the “Assignments” link on the website. If there are particular things you would like feedback on, make a note of that in the comment section.

Final Exam

Yes, even though Math Camp carries no course credit and has no letter grades, we will have a final exam. Studying for the final exam gives you the chance to consolidate your learning; and taking it will give you the chance check your understanding. Completing the Math Camp Exam will be your first homework assignment for PS 200A.

Books and Other Resources

We strongly recommend Sydsaeter and Hammond’s *Essential Mathematics for Economic Analysis.* Any edition is fine (later editions have additional coauthors.)**[1]** While this book displays the terseness that math books are known for, it is extremely clear and helpful. Many of Math Camp’s practice problems are adapted from this book. PDFs of some of the early chapters are available on the Math Camp website.

There are a couple of books by political scientists that cover a similar set of topics

Essential Mathematics for Political and Social Research by Jeff Gill

A Mathematics Course for Political and Social Research by Will Moore and David Siegel. This book is associated with Duke’s Math Camp, which is fully available online (with videos, problems etc.) **http://people.duke.edu/~das76/MooSieBook.html (http://people.duke.edu/~das76/MooSieBook.html)**

Finally, Khan academy covers all the Math Camp topics, offering short videos and additional practice problems.

The Most Important Thing

People learn math by doing math. The most important part of Math Camp will be the problems that you work. If you skip videos, lecture notes, book and workshops, but just work through all the practice problems successfully, you’ll be in fine shape for PS 200A-C. On the other hand, if you watch all the videos, read the notes and the book, attend all workshops but don’t **do those problems,** you will retain very little. The problems, and the effort you put into them, are the essence of Math Camp.

It's easy to get sucked into the crazy hope that you will learn math by reading and watching without working problems yourself. Resist this! It is like hoping you will learn to play guitar

by just watching someone else play, without ever putting your own fingers on the strings. Or hoping you will get strong by watching someone else lift weights. Learning doesn't work this way. Like learning an instrument, or getting physically fit, your first attempts at doing math may be painful and frustrating, especially if you're a novice, or long out of practice. That's normal. You might have to go through a little spell of dues-paying; that is also normal. Just persevere. The videos, notes, workshops, etc., are intended to help you get on with the business of practicing math; they are not a substitute for you actually doing it.

The goal of Math Camp is to prepare you to learn the tools of modern social science, tools that will bring your voice into the community of scholars, tools that will help you contribute to our understanding of political and social life. We're honored to be part of your journey.

[1] Note that Sydsaeter and Hammond have another, different book entitled just *Mathematics for Economic Analysis* (no "Essential.") This book is missing most of the early topics -- we don't recommend it unless your math background is already strong.