



Stony Brook
University

Math Camp

Political Science PhD Program

N-705, August 22 - August 26, 10am - 1pm, 2pm - 5pm
(5 days, 6 hours/day, unless otherwise specified)

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General Information

Course Description: The importance of mathematical methods, formal models, and statistics in political science is growing constantly. Furthermore, empirical methods become more and more complex and make use of advanced mathematical concepts. This course prepares you for these challenges and promotes basic knowledge to better understand current research in analytical political science. It is also meant to facilitate cooperation among students early on in the PhD program. Although intensive, this course will also be fun... I hope!

This course aims at familiarising you with mathematical concepts in basic calculus, static optimisation theory, vector algebra, and probability theory. This course is not intended to be an introduction to game theory or quantitative methods as such. Rather, it introduces basic mathematics and computer skills needed for quantitative and formal modeling courses offered in Stony Brook. It prepares you, in particular, for your PhD courses in the methods sequence (POL 602, POL 603, POL 604), Political Economy, and Game Theory (and subsequent classes). Given sufficient time throughout the week, students will also be introduced to L^AT_EX (a typesetting language useful for producing documents with mathematical content), R, and STATA (the statistical computing languages/environments used in the departments methods courses). These resources are very powerful, but some of them have a relatively steep learning curve, so one of the goals of the math camp is to give students a head start on these programs.

Structure & Requirements: The class will meet twice a day, 10am - 1pm and 2pm - 5pm. The early sections will cover mathematical and theoretical concepts whereas the afternoon sections will focus on applications and assignments (as well as introductions to software packages). Every day, there will be problem sets and exercises to work on during the sections (or as homework if not finished then). Students are encouraged to work on the exercises in groups of two or three. There is no university grade for the course; however, the performance of each student on quizzes and homework assignments will be recorded and used by the Graduate Committee to track student progress.

Prerequisite(s): None.

Textbook: There is no required text for this course. However, lectures are loosely based on Essential Mathematics for Political and Social Research (Gill, 2006).

Preparations for Math Camp: If you have some time during the summer and would like to get a head start and refresh your maths skills, check out the following website: <http://people.duke.edu/~das76/moosiebook.html>. There, you can find a link to a youtube channel that covers most of the topics we will talk about during math camp.

Other Books to Consult: (* = “beginners”, ** = “advanced”, *** = “state of the art”)

- * K. Sydsaeter and P. Hammond, 2008, Essential Mathematics for Economic Analysis, Prentice Hall.
- * J. Gill, 2006, Essential Mathematics for Political and Social Research, CUP.
- ** C.P. Simon and L. Blume, 1994, Mathematics for Economists, Norton.
- ** A.C. Chiang and K. Wainwright, 2005, Fundamental Methods of Mathematical Economics, McGraw-Hill.
- ** M. Pemberton and N. Rau, 2007, Mathematics for Economists, Manchester University Press.
- *** A. de la Fuente, 2007, Mathematical Methods and Models for Economists, CUP.
- *** A. Takayama, 2006, Mathematical Economics, CUP.

Tentative Course Outline:

The daily coverage might change as it depends on the progress of the class.

Day	Content
Monday, August 22	Overview, Basics, Linear Algebra I
Tuesday, August 23	Linear Algebra II <i>Notes:</i> Happy hour with grad students after session
Wednesday, August 24	Calculus I
Thursday, August 25	Calculus II
Friday, August 26	Set Theory and Basic Probability Theory; Basic Model Interpretation