

Mathematical and Statistical Foundations

Fall 2011 Intercession
Daily 09:00AM-11:50AM*
Social Science Building, Room 104
Final Exam 9/21 1:00PM - 4:00PM

Teaching Staff:

Supervising Faculty

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Instructors and Teaching Assistants

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Introduction

It is quite common for political scientists to use mathematical techniques to describe and analyze political phenomena. Mathematics provides the foundations for empirical propositions about relationships between political variables. Political scientists typically transform raw data from the real world into numerical generalizations using statistics. The role of mathematics in

*Except 9/19, 8:00 AM - 11:00AM

political science, though, is not restricted to the domain of statistical technique. Many political scientists also construct mathematical representations of political institutions to understand better how they work. Building these formal model entails picking out the most important aspects of a situation and then trying to express them mathematically. Over the years, though, the mathematical demands of modern political science have scaled up considerably. The goal of this course is to give the students a deeper understanding of the mathematics they need to know to work with statistical and formal models.

The class will meet daily for ten sessions, each lasting two hours and 55 minutes. Every afternoon, after class, teaching assistants will hold extended office hours for review and clarification. Readings are drawn primarily from our textbook, but several topics will require supplemental readings. Some basic knowledge of elementary calculus and probability theory is recommended, but it is not a requisite to take this class. There will be a final exam, as well as daily problem sets. These problem sets will be due one day after they are assigned. The sum of the weekly assignments is worth 70% of the final grade and the final exam accounts for 25 % of the final grade. Attendance accounts for the remaining 5 %.

Your grade for POL270 will be filed at the end of the fall quarter.

Required Textbooks

Textbooks to purchase

Carl P. Simon and Lawrence Blume. 1994. *Mathematics for Economists*. New York: Norton.

Online Readings and Resources

Fox, Jonathan. Applied Regression. Online Appendices available at:

<http://socserv.socsci.mcmaster.ca/jfox/Books/Applied-Regression-2E/Appendices.pdf>

Chou, Chien-Fu. "Lecture Notes on Mathematics for Economists".

<http://homepage.ntu.edu.tw/~econman/faculty/cfchou/MathEco1.pdf>

Courant and Robbins (1941) What is Mathematics? - Chapters 1-2 (1-116)

Course Outline and Readings

Date	Topic	Instructor	TA
9/6/2011	Sets, Numbers, and Proofs S & B, Appendix A1 (847-858). C & R, Chapters 1-2 (1-116).	Waugh	Kearney
9/7/2011	One-Variable Calculus. S & B, Chapter 2-5. <i>Session 2 Homework</i>	Bergman	Tiwari
9/8/2011	Integral Calculus. S & B, Appendix A4. <i>Session 3 Homework</i>	Bergman	Tiwari
9/9/2011	SD Blackout 2011.		
9/12/2011	Calculus of Several Variables. S & B, Chapter 12-15. <i>Session 4 Homework</i>	Bergman	Waugh
9/13/2011	9-12 AM Linear Algebra. S & B, Chapters 7-9 (122-197). <i>Session 5 Homework</i>	Waugh	Waugh
9/13/2011	2-5 PM Introduction to Game Theory Reading on Derek Liu's website.	Liu	Lupu
9/14/2011	NO CLASS (ORIENTATION)		
9/15/2011	Probability. Fox, Appendix D <i>Session 7 Homework</i>	Kearney	Cantú
9/16/2011	Random Variables. Fox, Appendix D. <i>Session 8 Homework</i>	Kearney	Cantú
9/19/2011	8-10:50 AM Optimization. S & B, Chapter 16-21. Chou, P44-60.	Sohn	Tiwari
9/20/2011	Eigenvalues and Dynamics. S & B, Chapters 23-25.3 Chou, p.5-24 of .	Sohn	Cantú