
POLS 6001: Mathematical Methods for Political Scientists

University of Houston, Department of Political Science

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Course Info:

Summer 2021

Time: T/Th/Sa 2:00–5:00 PM

Room Number: PGH 200

Course Description

This is a short course designed to review and refresh basic mathematical concepts for students beginning their second year in the graduate program. The course will cover the basics of algebra, probability and statistics, calculus (of one variable), and the linear regression model, and will be part lecture, part practice. For each topic, we will begin by discussing the relevant concept, and will demonstrate it by walking through problems together. I will then give you problems to work through either in groups or individually.

Grading Policies

Students will receive a grade of Satisfactory for attending the course and participating in class.

Textbook

Moore, Will H. and David A. Siegel. 2013. *A Mathematics Course for Political & Social Research*. Princeton, NJ: Princeton University Press.

Each day will contain references to chapters in this textbook. It would be wise to review these chapters prior to coming to class. If interested, you can also visit <https://tinyurl.com/MooSie-vids>, which will redirect to a YouTube playlist of video lectures by David Siegel. For each day, I have also included the relevant lecture(s) and modules from the playlist. Viewing these videos is **optional** but could be helpful.

Course Outline

Day 1

- Course introduction
- A review of algebra and functions
 - Ch. 2–3
 - Lecture 1, Modules 7–9
 - Lecture 2, Modules 1–6

Day 2

- Limits, sets, and sequences
 - Ch. 4
 - Lecture 2, Modules 7–10

Day 3

- Simple differentiation
 - Ch. 5–6
 - Lecture 3, Modules 1–6
 - Lecture 4, Modules 2–8

Day 4

- Second derivatives and optimization
 - Ch. 8, 16
 - Lecture 6, Modules 1–7

Day 5

- Integration
 - Ch. 7
 - Lecture 5, Modules 1–6

Day 6

- Integration (continued)

- Probabilities and distributions

- Ch. 9–11
- Lecture 7, Modules 2–5
- Lecture 8, Modules 1–8
- Lecture 9, Modules 4–9

Day 7 **WE WILL MEET ON MONDAY, AUG. 16 FOR THIS CLASS**

- Matrix algebra

- Ch. 12
- Lecture 10, Modules 1–8
- Lecture 11, Modules 1–2

Day 8

- Systems of equations

- Ch. 13
- Lecture 11, Modules 3–7

Day 9

- $(X'X)^{-1} X'Y$
- Ch. 12
- Lecture 10, Module 9
- A (very) brief introduction to R