

**Instructor:** Héctor Bahamonde

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**Location:** Hickman Hall 313

**Office Hours:** 5:00-6:00, Hickman Hall 602

## Overview and Objectives

**Substantive** The primary purpose of math camp is to provide students with a set of skills that will be needed to perform well in the quantitative methods courses offered at Rutgers and elsewhere. It will cover the foundational material of matrix algebra, basic calculus and basic probability.

**Computational** The secondary purpose of math camp is to provide students with computational skills that will be needed to perform well in the quantitative methods courses offered at Rutgers and elsewhere. We will learn the basics of **SPSS**, **STATA**, **R** and **TEX** (**w** or **m**). **If you have a laptop, please bring it to the workshop and have everything installed before the workshop starts** (click on the green links). In any case, the grad computer lab provides access to all these softwares. **Note:** Once you have installed the “core” of both **R** and **TEX** in your computer, you will need **RStudio** to “speak” with **R** and **TeXworks** to “speak” with **TEX**. Then, you need to download a standard **R template** and a standard **TEX template** (the **TEX template** contains everything you need for the problem sets). Interested students might want to go on-line and look for fancier **templates**, or more mathematical **symbols**.

## Required Text

The main source will be Kropko’s *Math for Political Science*. Interested students may also consult:

- Jeff Gill. *Essential Mathematics for Political and Social Research*. 2006, Cambridge University Press.
- Moore and Siegel. *A Mathematics Course for Political and Social Research*. 2013, Princeton University Press.

## Organization

- Sessions will be run workshop-style where the instructor will demonstrate a concept, which will be followed by a series of in-class practice exercises.
- Starting from January, 6th., students are required to hand in problem sets. There are 4 problem sets. You may hand in your answers in pencil and paper, but there are some answers that have to be delivered in printed format using **TEX** (emailed answers are fine too). You can print in the 4th grad lab. Finally, every morning, starting from January, 6th., students are assigned to solve one of the problem set’s exercises in the board.
- Some links, like for ex., problem sets’ links, will be activated the day we will need them, not before. Do not worry if you can’t open them. Some links are password protected. I will provide the password on January, 5th.

## Schedule

### 1. January, 5th

- Session 1 (10:30-12:30)
  - Introduction, logistics and course outline.
  - Motivation: what's our ultimate goal?
  - Linear algebra (1): ch. 9-10 Kropko.
- Session 2 (2:00-4:00)
  - No readings. In-class collective exercises.
  - Instructor gives **PS # 1**.

### 2. January, 6th

- Session 1 (10:30-12:30)
  - **PS # 1 due**. Students are assigned to solve one exercise in the board.
  - Linear algebra (2): selected sections of ch. 11, 12, 13, Kropko.
- Session 2 (2:00-4:00)
  - No readings. In-class collective exercises.
  - Instructor gives **PS # 2**.

### 3. January, 7th

- Session 1 (10:30-12:30)
  - **PS # 2 due**. Students are assigned to solve one exercise in the board.
  - Calculus (1): Ch. 4-5, Kropko.
- Session 2 (2:00-4:00)
  - No readings. In-class collective exercises.
  - Instructor gives **PS # 3**.

### 4. January, 8th

- Session 1 (10:30-12:30)
  - **PS # 3 due**. Students are assigned to solve one exercise in the board.
  - Calculus (2): selected sections of ch. 6-7-8, Kropko.
- Session 2 (2:00-4:00)
  - No readings. In-class collective exercises.
  - Instructor gives **PS # 4**.

### 5. January, 9th

- Session 1 (10:30-11:00)
  - **PS # 4 due**. Students are assigned to solve one exercise in the board.
- Workshop (11:00-4:00)

- Computing workshop 1. Open your  $\text{\LaTeX}$  template and start working on the **R** exercise. Once you're done with **R**, don't close  $\text{\LaTeX}$  and continue working with the **STATA** exercise. [Download](#) the data and the **DO** file. Finally, familiarize yourself with **SPSS** by clicking [here](#) and [here](#).
- Computing workshop 2. Choose a software, and evaluate this [dataset](#) running the next four regressions. As if you were writing a paper, show everything you think is important in a  $\text{\LaTeX}$  document. What can we learn from this exercise?
  - (a) regress  $y_1$  on  $x_1$
  - (b) regress  $y_2$  on  $x_2$
  - (c) regress  $y_3$  on  $x_3$
  - (d) regress  $y_4$  on  $x_4$
- Computing workshop 3. [Download](#) the **beamer** template, and make a small presentation (two-three slides) where you present one model and one table from the models you just run.