

# **Syllabus for GOVT 1101-103: Mathematical Models of Human Behavior, Spring 2014**

*Instructor:* Andrew Little, 301 White Hall, andrew.little@cornell.edu

*Location:* Tuesday/Thursday 11:40AM - 12:55PM, White 114

*Office Hours:* Tuesday 3-5pm

Mathematics has become central to how we theorize about human behavior. This seminar will examine some of the best and simplest applications of math to the social sciences, including Economics, Political Science, Sociology, and Psychology. The readings will address questions both large and small, such as why people vote, why wars occur, and why it is hard to purchase a used car. Writing assignments will ask students to critically examine whether the readings provide important insights into the social world and how they could be modified to better achieve that goal. A strong interest and background in math will be useful but far from necessary.

This is not a math class in any typical sense: there will be little lecturing, and all of the assignments will be writing rather than solving problems. Still, we will be reading arguments made in mathematical form, so the more comfortable you are with this, the better. As long as you are fluent in algebra all of the readings should be comprehensible, though some exposure to calculus, probability, and basic set theory will be helpful. More importantly, I ask that you are willing to work to understand the models, and be open-minded to the kind of analysis and assumptions they require.

Also, I strongly encourage you to work through some of the tougher readings together, and don't hesitate to ask me for help as well.

## **Learning Objectives**

The goals of this class are twofold. First, it aims to give you a taste of the potential (and pitfalls) of mathematical theorizing in the social sciences. We will not comprehensively cover any topic; the goal is to pique your curiosity to pursue these topics in more detail throughout your education. That is, I hope to convince those predisposed to technical majors to do more social science, and those predisposed to social science to do more math.

As this is a writing seminar, the second goal is to develop writing skills that you will use throughout your education and beyond. These include:

- Developing clear thesis statements and essay organization

- Constructing valid and sound arguments on the basis of outlines, preparatory writing, and revision
- Identifying the argument of a text and restating it clearly in your own words

## **General Policies**

### **Attendance and Participation**

As this is a small seminar, is particularly important that you (1) attend class, and (2) have done the readings and are prepared to discuss them. The reading loads will be deliberately light to make this feasible. Some of the readings will be hard – there is purposefully a bit of throwing you in the deep end and asking you to swim – and you aren't expected to understand every detail of every reading. However, you should make an honest effort to understand all that you can, and if things are confusing come prepared to discuss *why* they are confusing.

### **Assignments**

Assignments will be due at the beginning of class on the specified date unless otherwise noted. All written work must meet the following requirements:

- Typed, printed, and stapled
- Include your name, date, the course title, and an essay title at the top of page 1
- Standard font 12 pt (Times New Roman Arial, etc.)
- Double Spacing
- One inch margins
- Numbered Pages

All writings will be in the “public domain” of our class: in addition to the instructor, some assignments will be read by your peers.

## **Evaluation**

The majority of your grad will come from the writing assignments, which will increase in length and weight.

Both writing assignment 1 and the drafts for the later assignments are all graded on a pass/fail basis. That is, if you fulfill the requirements of the assignment and bring it to class on time, you will get full credit, otherwise you will get no credit.

- Participation: 10%
- Writing Assignment 1: 10%
- Drafts for assignments 2-5: 25% (5% each)
- Writing Assignments 2-5: 40% (10% each)
- Writing Assignment 6: 15%

## **Late Assignments**

Please consult the course schedule for information about due dates. Extensions and permission to submit late work will only be granted in extenuating and unavoidable circumstances outlined to the instructors in writing prior to the due date in question. Such circumstances include medical or family emergencies. Multiple assignments from other courses scheduled for the same date – or other work commitments – do not constitute acceptable reasons for extensions, so please plan accordingly. Late assignments will be penalized one-third of a letter grade per day late. This means that if your paper had been submitted on time and received a grade of A-, it will become a B+ after one day, a B after two, and so on. Extensions will not be granted in any case after the submission deadline. NOTE: As stated above, because draft or outline assignments are timed to coincide with in-class review they must be submitted on the assigned dates. Any late drafts/outlines will receive a grade of 0/5. No exceptions.

## **Appealing Grades**

If you believe your grade on an assignment does not reflect the quality of the work, you can appeal given the following guidelines:

- Wait 24 hours, but no more than a week after receiving the grade

- If you still would like to appeal, email me a clear and short explanation of why you believe the grade is incorrect
- If I find some merit in your argument, we will schedule an appointment to discuss
- I reserve the right to give a *lower* grade following any appeal

## **Plagiarism**

Students should review Cornell University's policy towards plagiarism and violations of academic ethics ([plagiarism.arts.cornell.edu](http://plagiarism.arts.cornell.edu)). The strength of the university depends on academic and personal integrity. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery, and falsification, lying, facilitation of academic dishonesty, and unfair competition. I have a zero tolerance policy towards plagiarism. All suspected cases of plagiarism will be passed on to the Academic Integrity liaison for disciplinary review. If you are in doubt about whether you are committing plagiarism, feel free to ask me and I will be happy to help; but a good rule of thumb is that if you are wondering about this, you should cite a source.

## **Communication and Office Hours**

My office hours are from 3-5 on Tuesday afternoon in White Hall 301. If you would like to meet outside of that time, I will try to accommodate you, but can not make any guarantees.

I am usually able to respond to emails within 24 hours.

If you have to miss class for any reason, you must let me know as early as possible.

## **Electronic Devices**

You are welcome to bring your laptop, tablet, or other similar device to class. (One can even save paper by not printing out the readings!) However, to prevent the inevitable distractions, the wifi on your devices must be turned off during class. Further, phones must be turned off. Again this is a seminar, so being distracted is not only rude to the instructor, but to your fellow students who will be doing most of the talking!

## **The Knight Institute Writing Walk-In Service**

The Writing Walk-In Service (WWIS) provides support for individuals at any stage of the writing process. It is a free resource available to everyone on campus - faculty, staff, graduate and undergraduate students - for nearly any kind of writing project: applications, presentations, lab reports, essays, papers, and more. Tutors (trained undergraduate and graduate students) serve as responsive listeners and readers who can address questions about the writing process or about particular pieces of writing. They can also consider questions of confidence, critical reading, analytic thought, and imagination. Many writing tutors also have experience working with non-native speakers of English.

The WWIS operates out of several campus locations. During the academic year, the WWIS is open Sunday through Thursday from 3:30 – 5:30pm and from 7:00 – 10:00pm. Writers can schedule appointments or drop in at a convenient time. For more information or to schedule an appointment: <http://www.arts.cornell.edu/writing>

## **Accessibility Needs**

If you have a condition that affects your ability to participate fully in class or to meet all course requirements, please speak with me after the first day of class so that we can work together to arrange appropriate accommodations. This syllabus and other course materials can be made available in alternate formats. Any student with a disability who may need accommodations in this class must obtain an accommodation letter from Student Disability Services, 420 CCC, Garden Ave Ext ([sds.cornell.edu](http://sds.cornell.edu)).

## **Schedule**

What follows is an initial plan for our “substantive” readings, with some classes set aside for discussing the written assignments. We will cover additional topics on writing as well. The writings are moderately organized into 6 sections, each with one writing assignment.

## **1 Introduction**

**Jan 23**

Class overview, games

**Jan 28**

The Signaling Model of Education; Writing Emails

- Michael Spence, "Job Market Signaling"
- Chris Blattman, "Students: How to email to your Professor, employer, and professional peers"

## **2 The Prisoner's Dilemma**

**Jan 30 (PAPER 1 DUE)**

Preferences, Games and Nash Equilibrium

- Sections 1.1 - 1.2 and 2.1-2.7 from Martin Osborne, "An Introduction to Game Theory"

**Feb 4**

The (Repeated) Prisoners' dilemma

- Robert Axelrod, "The Evolution of Cooperation", Chapter 1
- "They Say, I Say", Introduction (pp 1-15)

**Feb 6**

The Prisoner's Dilemma Tournament

- Robert Axelrod, "The Evolution of Cooperation", Chapter 2
- Excerpt from William Poundstone "Prisoner's Dilemma"

**Feb 11**

"New" Approaches

- "The Emerging Revolution in Game Theory"
- "They Say, I Say", Chapter 1

**Feb 13 (DRAFT OF PAPER 2 DUE)**

Peer review of drafts

- “The Say, I Say”, Chapter 2

**Feb 18: NO CLASS (February Break)**

**Feb 20: TBD**

**3 Coordination and Collective Action**

**Feb 25 (PAPER 2 DUE)**

From PD to Coordination

**Read:** Thomas Schelling, “The Strategy of Conflict”, Chapter 3; Roger Myerson “Fundamentals of Social Choice Theory” pages 305-308

**Feb 27**

Threshold Models of Collective Action

- Mark Granovetter, “Threshold Models of Collective Behavior”
- “They Say, I Say”, Chapters 3-4

**Mar 4**

Anti-Coordination.

- Brian Arthur, “Inductive Reasoning and Bounded Rationality”
- “They Say, I Say”, Chapters 4-5

**Mar 6 (DRAFT OF PAPER 3 DUE)**

Peer review of drafts

- “They Say, I Say”, Chapters 6-7

## **Elections and Voting**

**Mar 11 (PAPER 3 DUE)**

Is it Rational to Vote?

**Read:** William Riker and Peter Ordeshook, "A Theory of The Calculus of Voting"

**Mar 13**

Electoral Competition and the Median Voter Theorem

**Read:** Shepsle and Bonchek "Analyzing Politics", chapters 3-4

**Mar 18**

Arrow's Impossibility Results

**Read:** Shepsle and Bonchek "Analyzing Politics", chapter 5

**Mar 20**

Why comply with democracy?

**Read:** Adam Przeworski, "Democracy and the Market", chapter 1

**Mar 25 (DRAFT OF PAPER 4 DUE)**

Peer Review of Drafts

**Mar 27:TBD**

**April 1, 3: NO CLASS (Spring break)**

## **4 Bargaining**

**April 8 (PAPER 4 DUE)**

Introduction to Bargaining.

**Read:** Thomas Schelling, "An Essay on Bargaining"



## **April 10**

Bargaining and War

**Read:** James Fearon, "Rationalist Explanations for War"

## **April 15**

Bargaining and Cars

**Read:** George Akerlof, "A Market for Lemons". See the wikipedia entry for a less econ-centric explanation: [https://en.wikipedia.org/wiki/The\\_Market\\_for\\_Lemons](https://en.wikipedia.org/wiki/The_Market_for_Lemons)

## **April 17 (DRAFT OF PAPER 5 DUE)**

Peer Review of paper 5

## **5 Odds and Ends**

### **April 22 (PAPER 5 DUE)**

Malthusian Trap.

**Read:** Gregory Clark, "A Farewell to Alms", chapter 2

### **April 24**

Segregation.

**Read:** Thomas Schelling, "A Model of Segregation" <http://www.avanderw.co.za/schellings-segregation-simulation/>

### **April 29**

Debating the Value of Math in Social Sciences, part 1

### **May 1**

Debating the Value of Math in Social Sciences, part 2

### **May 6 (DRAFT OF PAPER 6 DUE)**

Peer review of paper 6

**Mat 14: PAPER 6 DUE**