

# POL2504H1F: Statistics for Political Scientists

University of Toronto

Fall 2013

Meeting Room: FE 36  
Meeting Time: Friday, 10:00am–12:00pm

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Office hours: Wednesday, 2:00–4:00pm

## Course Description

This course introduces the basics of quantitative, empirical political science research. By the end of the semester, you are expected to have a sound understanding of:

1. Representative research strategies to investigate the *causal* relationship of political phenomena of interest (a.k.a. *research design*), and various threats to the validity of different research designs;
2. How to use statistics to learn about the characteristics of a large population from a relatively small sample (a.k.a. *statistical inference*) — e.g., how to learn the opinions of the entire Canadian citizens from a sample of a few thousands;
3. How to conduct, interpret, and critically assess a *regression analysis* — arguably the most basic method used in quantitative social science research; and
4. How to use a statistical computer software for basic analyses.

The course assumes no prior training in mathematics or statistics; however, willingness to work hard on unfamiliar materials is expected.

## Required Textbooks

The following textbook is the officially required book for this course. The assigned readings will be from this book and edition, and you are expected to understand the materials at the level of sophistication in this textbook. If you already have a textbook that is similar to or more advanced than this textbook, you may use it for this course; however, it would be your responsibility to identify appropriate chapters for each class and fill gaps if any.

Alan Agresti and Barbara Finlay, *Statistical Methods for the Social Sciences, Fourth Edition* (Prentice Hall, 2008).

All other readings will be made available through the class Blackboard site.

## **Grading and Evaluation**

Grades in the course will be based on the following items:

1. Assignments: 60%

There will be almost-weekly assignments. They will include a critiquing to journal articles, analytical questions, statistical programming exercises, and data analyses. Some assignments may be group-assignments, in which you will be randomly assigned to a group of three to five students, collaborate on the problems, and submit a single assignment per group. Some assignments may be online quizzes through the class Blackboard site. Each assignment will be weighted equally.

2. Final Exam: 30%

Final exam will be a closed-book, closed-note test on the course materials covered throughout the semester. The exam will take place on the last day of the class.

3. Class Participation: 10%

The quality and quantity of your contributions to in-class discussions and to Q&As and discussions on the Discussion Board of the class Blackboard site will be assessed toward the class participation grade.

## **Computer Software**

Quantitative social science research requires the use of computers. In this class, you will use a software package called R, which is free to download at <http://www.r-project.org> and is getting popular among many social scientists. By the end of the semester, you are expected to be able to conduct a basic quantitative empirical analysis using R on your own.

## **Office Hours**

You are welcome to visit during the instructor's office hours, which will be held during the time and date specified at the beginning of the syllabus, if you have any questions on class materials. If you have a schedule conflict with the instructor's regular office hours, you are welcome to send the instructor an email to set up an appointment.

## **Discussion Board**

We will also use the Discussion Board in the class Blackboard site as the main medium through which you can ask questions regarding class materials and get answers. Given the nature of the course materials, someone else may have the same question as yours and s/he would benefit from your posting the question and getting an answer through the Discussion Board. You are also encouraged to post an answer to the questions posted by your classmates on the Discussion Board so that we can maintain a mutually-supporting learning community from which all of you benefit. The instructor will regularly check the Discussion Board (at least once in two working days) and answer questions which have not been adequately addressed by peers. For more

complex questions or those that would require an extensive treatment, you are best advised to visit the instructor's office hours.

## **Email Policy**

If you have questions of personal nature (e.g., accessibility, appointment, deadline extension), you may email the instructor and expect a response within two working days. Please start the subject heading of your email with "POL2504:..." I will not answer, however, any questions over email that are of substantive nature concerning the class materials. You will need to post those questions on the Discussion Board or visit my office hours to get them answered.

Please note that I will not be able to answer email or Discussion Board questions during weekends.

In the case of your questions of substantive nature on the Discussion Board or those of personal nature over email not answered within two working days (excluding weekends), send me an email to let me know they have not been addressed. Please include "POL2504: Unanswered Question" in the subject heading of your email.

## **Late Penalties and Extension**

All work is late if submitted after the date and time specified as the due date. There will be two different late penalties, depending on the nature of the assignments.

- ▷ For a relatively short assignment, such as critiques to journal articles and online quizzes, a zero grade will be given if it's submitted after the specified due date and time.
- ▷ For a relatively extensive assignment, such as data analyses and statistical programings, the assignments handed in late will result in a penalty of 20 percentage points reduction per day (e.g., from 90% to 70%). The assignments handed in more than five calendar days late will receive a zero grade.

When an assignment is given, it will be announced that which category the particular assignment falls in.

Extension may be made if there is a legitimate reason, such as an unforeseeable medical emergency. You may be requested to provide a documentation.

## **Academic Integrity**

You are expected to be familiar with [the Code of Behaviour on Academic Matters](#), which is the rule book for academic behaviour at the U of T. Potential offences include, but are not limited to, plagiarism, cheating on tests and exams, fraudulent medical documentation and improper collaboration on marked work. The University of Toronto treats cases of academic misconduct very seriously. All suspected cases of academic dishonesty will be investigated following the procedures outlined in [the Code](#). The consequences for academic misconduct can be severe.

## **Class Topics**

The following topics will be covered in the order that they are listed. Corresponding chapters of the textbook are also specified. The exact dates when these topics will be covered are not specified on purpose, since the predetermined schedule is bound to be adjusted in this type of course. The basic principle is that we proceed as fast as possible given that everyone in the class understands the material.

There may also be additional readings, such as journal articles, book chapters, and R tutorials, which have not been included below. These additional readings will be announced at least one week before the class and posted at the class Blackboard site.

### **Part I: Basics of Quantitative, Empirical Political Science Research**

1. Causal Theory and Research Design.  
See the class Blackboard site for the assigned journal articles.
2. Data, Measurement, and Descriptive Statistics.  
Agresti and Finlay, Chapters 1, 2.1-2.3 and 3.

### **Part II: Statistical Inference**

3. Probability Distribution and Sampling Distribution.  
Agresti and Finlay, Chapters 2.3 and 4.
4. Point Estimation and Interval Estimation.  
Agresti and Finlay, Chapters 5.1-5.3 and 5.6.
5. Hypothesis Testing.  
Agresti and Finlay, Chapters 6.1-6.3, 6.5 and 6.8.

### **Part III: Linear Regression**

6. Bivariate Linear Regression Model.  
Agresti and Finlay, Chapters 9.1-9.3 and 9.5-9.6.
7. Multivariate Linear Regression and Model Specification.  
Agresti and Finlay, Chapters 11.1, 11.3-11.5 and 14.5-14.6.
8. Outlier, Omitted Variable Bias, and Variation of Multivariate Relationship.  
Agresti and Finlay, Chapter 10.
9. Regression Assumptions and Diagnostics  
Agresti and Finlay, Chapters 14.2-14.3.

## **Part IV: Advanced Topics**

The following topics will be covered if time permits.

10. Logit/Probit Model for a Binary Dependent Variable

Agresti and Finlay, Chapters 15.1-15.4 .

11. Generalized Linear Models

Agresti and Finlay, Chapters 14.4.

12. Instrumental Variable Estimation.

TBA.

13. Causal Inference, Counterfactual Framework, and Matching Estimation

TBA.

## **Syllabus Change Policy**

The policies and contents of this syllabus may be changed by the instructor with advanced notice. If any, such a change will be announced during lectures.