
Washington University in St. Louis
Department of Political Science

Pol Sci 571. Quantitative Methods of Analysis I

Spring 2003 Semester

Instructor

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Hours: By appointment only

Class Schedule

MW 2:00-3:30 PM
Eliot Hall 316

Course Description

What is the probability that two states will go to war in a particular year? How likely is it that Justice O'Connor will vote to grant *cert* in an abortion rights case? How strong is the relationship between issue preferences and voter behavior? Do domestic political institutions systematically impact currency markets?

The use of quantitative methods allows political scientists to answer these types of questions. This course is a first look at these methods. The major topic will be probability theory and introductory inferential statistics. These two topics form the infrastructure on which all statistical work is based. To understand these more advanced methods, it is vital to have a background in these topics. Unfortunately, this means that we will read little applied research, and will devote most of our time to the abstract world of probability theory and the logic of statistical inference.

There is no formal prerequisite for this course, although familiarity with algebra, calculus, and elementary linear algebra is assumed. Experience at the level of Political Science 5052 (Mathematical Modeling in Political Science) suffices.

Requirements and Evaluation

The requirements for this course are simple – attend class and complete the assignments on time. This is a lecture based course, which will proceed as quickly or slowly as is necessary. Since this is a graduate level course, it need not be said that class attendance is mandatory. Late assignments will not be accepted.

Each Wednesday of the course I will assign a graded homework assignment. These assignments will be due on the following Monday. Most exercises will come from the textbook, some with solutions provided in the back of the book. The assignments are due in class on Monday, and will be returned the following Wednesday. These will be graded by the graduate teaching assistant

and the instructor. Students are encouraged to collaborate on these assignments, however each student must turn in their own written answers. Clarity of presentation and argument are of utmost importance when preparing these homeworks. There will be approximately fourteen (14) homework assignments, of which the top twelve (12) will count toward the final grade. Homeworks count for 30% of the final course grade.

In addition to the homework assignments there will be three examinations: two midterms, and a final. Each midterm will count for 20% of the final grade, and the final exam will count for 30% of the final grade. The midterms will be conducted during the scheduled class time, and the final will be conducted at the time scheduled by the graduate school. Because this course is a prerequisite for future courses, *no incompletes will be assigned for any reasons*. Failure to meet the requirements of the course will result in a failing grade.

Readings

The primary textbook for the course is [hereafter DeGroot]:

Morris H. DeGroot and Mark J. Schervish. 2002. *Probability and Statistics*, Third Edition. Reading, MA: Addison-Wesley. ISBN: 0201524880.

This can be purchased at the bookstore, or at your favorite internet bookseller. DeGroot's book is a classic, and is used in many mathematics, economics, and statistics courses. This book was recently updated from the second edition (published in 1986) by Schervish after DeGroot's passing in 1989. It is important to make sure you have the third edition, as there are many changes from the second edition. Each student should carefully read the assigned sections of the text before class, and bring any questions to class.

In addition to DeGroot, I will draw from supplementary material from a good undergraduate statistics text [hereafter A & F]:

Alan Agresti and Barbara Finlay. 1997. *Statistical Methods for the Social Sciences*, Third Edition. Upper Saddle River, NJ: Prentice Hall. ISBN: 0135265266.

The instructor will provide photocopies of the assigned chapters. Some students may wish to purchase this text as a supplement to DeGroot, and as an introduction to some elementary methods. For your information, this text is not available in the bookstore, but it can be purchased online.

The reading load for this course is trivial, perhaps ten or twenty pages a class. However, the work load will be high. It is important to carefully read and understand every result in the text *before the class meeting*. This requires full attention when reading the text. The problem sets will also consume a substantial amount of time.

To provide a forum for communication outside of class, not only between instructor and student, but also between students, I have established an email mailing list. It is necessary for each of you to sign up for the list, and I encourage you to contribute to the list. Oftentimes if you have a question about the text or lecture many of your colleagues will as well. It is best to use the listserv as a forum to pose the questions you have, and to answer the questions that are posed. Of course you can ask the instructor these questions, but the common good will be served by using the mailing list.

Tentative Course and Topics Schedule

The following is a tentative schedule for the course. Hopefully we will cover all of this material. We will go as fast, or as slow, as needed. To wit, I have not assigned firm dates for each topic. The following, though, is the order we will cover the material. Note that each topic may take more than (or less than) one class session.

Dates	Topic	Reading
(____).	Introduction to Probability I	DeGroot 1.1-1.5
(____).	Introduction to Probability II	DeGroot 1.6-1.8
(____).	Introduction to Probability III	DeGroot 1.9-1.11
(____).	Conditional Probability	DeGroot 2.1-2.3
(____).	Random Variables and Distributions I	DeGroot 3.1-3.3
(____).	Random Variables and Distributions II	DeGroot 3.4
(____).	Random Variables and Distributions III	DeGroot 3.5-3.7
(____).	Random Variables and Distributions IV	DeGroot 3.8-3.9
(____).	Midterm Exam I	
(____).	Expectation I	DeGroot 4.1-4.2
(____).	Expectation II	DeGroot 4.3-4.5
(____).	Expectation III	DeGroot 4.6-4.8
(____).	Special Distributions I	DeGroot 5.1-5.2, 5.4
(____).	Special Distributions II	DeGroot 5.6-5.7, A & F 4.2
(____).	Special Distributions III	DeGroot 5.12
(____).	Sampling Distributions I	DeGroot 6.1, 7.1-7.2
(____).	Sampling Distributions of II	DeGroot 7.3-7.4, A & F 4.3-4.4
(____).	Confidence Intervals	DeGroot 7.5, 7.7, A & F 5.1-5.3
(____).	Midterm Exam II	
(____).	Hypothesis Testing I	DeGroot 8.1-8.2, A & F 6.1-6.4
(____).	Hypothesis Testing II	DeGroot 8.4-8.5, A & F 6.5-6.7
(____).	Hypothesis Testing III	DeGroot 8.6, A & F 7.1-7.4
(____).	Hypothesis Testing IV	DeGroot 8.7, 8.9
(____).	Methods for Categorical Data I	DeGroot 9.1-9.4, A & F 8.1-8.3
(____).	Methods for Categorical Data II	DeGroot 9.4-9.5
(____).	Linear Statistical Models I*	DeGroot 10.1-10.2, A & F 9.1-9.4
(____).	Linear Statistical Models II*	DeGroot 10.3, 10.5-10.6, A & F 9.5-9.6
(____).	Linear Statistical Models III*	DeGroot 10.5, A & F 11.1-11.4
(____).	Final Exam	

*These topics will only be covered time permitting.