POLSCI-701: Techniques of Political Science Research
4-6:40PM, Wednesdays (9/2/09-12/16/09), BOL 293

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This course is designed to get you involved as consumers and producers of quantitative social science research. As consumers, you will be required to read and understand quantitatively oriented journal articles. Thus, even if you think you are not interested in writing quantitative research, you will very likely have to read quantitative research in your courses and in research for your thesis. That said, I hope this course spurs some interest in quantitative research even for those who thought they were not interested in quantitative work to begin with. This course also provides the fundamentals of statistical analysis in general.

I realize that for many, if not most students in this course, this will be their first interaction with quantitative methods. Some may have had little to no math experience since high school by coincidence and others by design. While there will certainly use some math in the course, I will approach these concepts assuming no comfort with mathematics aside from basic arithmetic (and even then, we will go over in depth important mathematical results and formulae). If you are having trouble with the concepts, please ask questions in class. Others will likely be confused by some of the same issues. If you continue to have trouble in the course, please see me during office hours or make an appointment and we can clear up any problems as they arise. DO NOT wait until right before the test to try to clear up all of your accumulated problems. Statistics is a cumulative enterprise, so a lack of understanding early can compound itself as the class moves forward.

As you are all graduate students, I expect that you will take this class seriously regardless of your inherent interest in the subject matter. I expect that you will attend class regularly, do the readings and ask questions when something is confusing. If you miss class, you are responsible for learning the material you missed in a manner that proves least distracting for the other participants in the course. Also, the late work policy is that make-up exams are not given to graduate students and late papers are not accepted (rare exceptions may be allowed on a case-by-case basis).

We will be using STATA as the primary statistical package for this course. STATA is a relatively easy-to-use program and is available for use outside the classroom in the computer lab located at Bolton 225, as well as other labs on campus. In addition, students can
obtain discounted versions of STATA via the grad plan offered by STATA Corporation (http://www.stata.com/order/new/edu/gradplan.html). The current version of Stata on offer is 11 and is available in a one-year license for $98 and in a perpetual license for $179. You will also need a calculator for the course. This does not have to be a fancy calculator, it would be helpful if it had the square function (usually something like $x^2$) and the square-root function (usually either $\sqrt{x}$ or $\sqrt{x}$) is essential.

You final grade in the course will depend on the following:

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<th>Percentage</th>
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<tr>
<td>Homework</td>
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<td>First Exam</td>
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<td>Second Exam</td>
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**Homework**

You will get weekly assignments of various lengths and types some of the questions can/should be answered with pencil and paper while others will utilize the computer. You should consider your colleagues a resource and I encourage you to discuss the problem sets with your them. That said, each person must turn in their own, original answers to the homework problems. Further, you’ll notice that only 30% of the grade comes from the homework, thus it makes sense for you to do your own work so you can pass the other 70% of the course.

**Exams**

The first exam will test you on material from roughly the first half of the course and the second one will be cumulative. These will be entirely pencil and paper affairs; you will not need to use the computer at all. To put your mind at ease now, you will not need to memorize formulae. For each exam, you will be allowed to bring with you one (1) standard sheet of letter-sized paper (8.5” x 11”) with whatever types of information you want written on either side. You will obviously need to know which formulae apply to which problems, but that is not a task that requires memorization so much as it is a task that requires understanding of which procedures are appropriate for which types of problems.

**Textbook**

The required text for the course is:


I may provide some additional reading materials that will elucidate points covered in the lecture, but I will make those available electronically as they are needed.
Miscellaneous

You may obtain information on UWM policies concerning academic issues and course conduct here: [http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf](http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf). While predictions of widespread outbreaks of H1N1 are (hopefully) of the worst-case-scenario variety, there is some possibility that an outbreak of H1N1 could disrupt University operations. In the event of disruption of normal classroom activities due to an H1N1 swine flu outbreak, the format for this course may be modified to enable completion of the course. In that event, you will be provided an addendum to this syllabus that will supersede this version.

Outline

The outline below offers a chronological list of topics covered, but each topic does not necessarily represent a complete lecture’s worth of material. Rather, some topics will require more than one class period to complete, while others can be covered in less than a single class period.

1. Introduction
   (a) What do we mean by statistics and why would we use them?
       **Read:** pages 2-9
   (b) Data, variables and measurement
       **Read:** pages 38-43

2. Univariate Statistical Description
   (a) Frequency Distributions and graphical displays
       **Read:** pages 44-50, 56-62, and 71-77
   (b) Measures of Central Tendency
       **Read:** pages 92-101
   (c) Measures of Variability and Dispersion
       **Read:** pages 106-114
   (d) The Five Number Summary and Boxplots
       **Read:** pages 122-130
   (e) Populations and Samples
       **Read:** pages 136-140
   (f) z-scores and standardized variables
       **Read:** pages 140-144
3. Probability
   (a) Basic definition and concepts
       Read: pages 156-172
   (b) Combining Probabilities
       Read: pages 175-179
   (c) Contingency Tables and Conditional Probabilities
       Read: pages 183-193
   (d) Independent Events
       Read: pages 197-202

4. Probability Distributions
   (a) Basic Concepts
       Read: pages 232-245
   (b) The Binomial Distribution
       Read: pages 249-259
   (c) The Normal Distribution
       Read: pages 280-302

5. Statistical Inference
   (a) Basic Concepts
       Read: pages 12-22, 326-334
   (b) Sampling Distribution of a Sample Mean
       Read: pages 343-349

Midterm Exam

6. Interval Estimation
   (a) Confidence Interval for the mean
       Read: pages 358-388
   (b) Confidence Interval for proportions
       Read: pages 608-617

7. Statistical Hypothesis Tests
   (a) The logic of hypothesis Testing
       Read: pages 400-414
   (b) Hypothesis tests for the population mean
       Read: pages 418-455
   (c) Hypothesis tests for the population proportion
       Read: pages 622-625
8. Testing for Difference Between Two Populations
   (a) Basic Concepts
       **Read:** pages 486-492
   (b) Inference for two population means
       **Read:** pages 494-514
   (c) Inference for two population proportions
       **Read:** pages 629-636
   (d) Inference for paired data
       **Read:** pages 534-542

9. Statistical Inference for the Variance and Standard Deviation
   (a) The Chi-square distribution
       **Read:** pages 574-576, 650-651
   (b) Inference for one population standard deviation
       **Read:** pages 576-582
   (c) Inference for two population standard deviations
       **Read:** pages 589-597

10. The Chi-Square Test
    (a) Goodness of fit
        **Read:** pages 651-656
    (b) Crosstabulation
        **Read:** pages 662-666
    (c) Tests for Independence
        **Read:** pages 674-681

11. Descriptive Methods of Linear Association
    (a) The linear equation
        **Read:** pages 696-699
    (b) Correlation
        **Read:** pages 726-732
    (c) Linear Regression
        **Read:** pages 701-706
    (d) Linear Model Fit
        **Read:** pages 717-723

**Final Exam - Wednesday, December 16, 4:00 PM**