# PSC 506
# Advanced Topics in Methods

**Prof. Curtis S. Signorino**
303 Harkness Hall
Office Hours: By Appointment
curt.signorino@rochester.edu
273-4760

**PURPOSE:** This course covers topics that one might encounter in advanced political methodology research, but which are not yet standard fare in methods courses: e.g., Bayesian methods, bootstrapping, nonparametric regression, semiparametric methods, neural nets, etc. As a research workshop, this course will also allow students to pursue areas of individual interest in more depth. The course content, therefore, depends not only on what I want to cover, but also on what students want to cover. Finally, since students taking 506 are assumed to be interested in political methodology as a major field, they will be required (1) to solve "unsolved" problems during the semester and (2) to write a research paper that makes a contribution to the methods literature.

**PREREQUISITES:** Students must have taken PSC 404, 405, and 505. Students who would like to waive these courses based on courses previously taken must have those courses approved by me.

**COURSE REQUIREMENTS:**

- **Participation and Weekly Assignments (50%)**. Students will be responsible for having done the required readings each week and for participating in our discussions. Applied or theoretical problems will be assigned each week based on the required readings. Students will be expected to have completed the assignment and should be prepared to present their results in class.

- **Final Paper (50%)**. A final paper is due on July 1. The paper must make a contribution to political methodology.

**COURSE SCHEDULE AND READINGS:** Based on student input, this year we will cover the topics listed below. The numbering designates only the sequence of the topics, not the actual week in which we will be covering that topic. Texts for each topic are listed below. You should purchase as many of these texts as possible. Having said that, most will be available in the star lab. I have denoted with an asterisk (*) the text you should purchase, if you are going to purchase only one per topic. In addition to the texts below, I will often also assign articles each week. Students will use the R programming language for much of this course. As such, you may want to purchase the following texts on R:

Peter Dalgaard. *Introductory Statistics with R*. Springer.
John Fox. *An R and S Plus Companion to Applied Regression*. Sage.
W.N. Venables and B.D. Ripley. *S Programming*. Springer.
*W.N. Venables and B.D. Ripley. *Modern Applied Statistics with S*. 4th edition. Springer.

**1. Course Organization**

**2. Parallel Processing in R**

**3. Bayesian Methods**
Unfortunately, there is no perfect Bayesian text. Each of the following does something well that the others don't. Gill is the most accessible and includes R routines. Congdon addresses numerous, specific models you're likely to run in doing your own research. Gelman et al is a canonical reference that also includes excellent computational advice. Lee is a Bayesian inference text, not a text on MCMC.

Peter Congdon. *Bayesian Statistical Modelling*. Wiley.
Andrew Gelman, John Carlin, Hal Stern, and Donald Rubin. *Bayesian Data Analysis*. Chapman & Hall.
*Jeff Gill. *Bayesian Methods*. Chapman & Hall/CRC.
Peter M. Lee. *Bayesian Statistics*. 2nd edition. Arnold.

See also
W.R. Gilks, S. Richardson, and D.J. Spiegelhalter. *Markov Chain Monte Carlo in Practice*. Chapman & Hall/CRC.

**4. Ideal Point Estimation**
*Keith Poole. *Spatial Models of Parliamentary Voting*. Cambridge Univ.

**5. The Bootstrap**
A.C. Davison and D.V. Hinkley. *Bootstrap Methods and their Applications.* Cambridge.
*Bradley Efron and Robert J. Tibshirani. *An Introduction to the Bootstrap*. Chapman & Hall/CRC.

**6. Nonparametric Smoothing/Regression**
*John Fox. *Nonparametric Simple Regression*. Sage.
John Fox. *Multiple and Generalized Nonparametric Regression*.

See also applicable chapters in:
David Ruppert, M.P. Wand, and R.J. Caroll. *Semiparametric Regression*. Cambridge.
Adonis Yatchew. *Semiparametric Regression for the Applied Econometrician*. Cambridge.

**7. Factor Analysis**
TBD

**8. Propensity Scores and Matching**

**9. Semiparametric Estimation**
Hold off purchasing these texts until we're certain we will cover this during the semester.

Joel L. Horowitz. *Semiparametric Methods in Econometrics*. Springer.
*David Ruppert, M.P. Wand, and R.J. Caroll. *Semiparametric Regression*. Cambridge.
*Adonis Yatchew. *Semiparametric Regression for the Applied Econometrician*. Cambridge.

**10. Student Project Presentations (last class)**


*Paper due July 1*