2003 to 2014 Archive

2013-2014 ITV Course Schedule

Fall 2013:

"Questionnaire Design" – Instructor Joanne Miller
Wednesdays 2:30 pm – 4:30 pm EST, 1:30 pm – 3:30 pm CST
Email: mille441@umn.edu

Description: This course offers a review of some of the major theoretical and empirical issues associated with survey questionnaire design and prepares students in the fundamental skill areas necessary to design their own surveys and critique existing questionnaires.

DATES: Sept 4, 11, 18, 25; Oct. 2 – no class; Oct. 9, 16, 23.

Spring 2014:

"Panel Data Analysis" – Instructor Brian Gaines
Wednesdays 2:30 pm – 4:30 pm EST, 1:30 pm – 3:30 pm CST
Email: bjgaines@uiuc.edu

Description: This course will introduce the very large and rapidly growing statistical literature on analyzing data in which observations are a cross section of some units (e.g. individuals, countries, states, firms) over multiple time periods. I will use "panel data" in a broad sense to mean any data spanning multiple dimensions, usually (but not necessarily) time and space. I will not explicitly restrict attention to cases in which we have much larger Ns than Ts, as is sometimes done. In general terms, the advantage to having time and space variance is that one can avoid inferring that inter-personal differences across units are equivalent to inter-temporal differences within units. For instance, in a cross-section if we find that age is a significant predictor of voting, we often infer that this result implies a forecast that all members of the relevant population will vote with increasing probability as they age. From a time series on just one unit, we might make the companion inference: that an observed life-cycle change in one unit implies across-age variation in a population that is heterogeneous in age in any given time period. With data that vary on both dimensions, one can better disentangle inter-unit and inter-temporal variance, and thus, in many contexts, adjudicate between rival behavioral theories. The increasing availability of large data sets and powerful computers has made panel models more and more prominent in social science data analysis.

DATES: Jan. 22, 29, Feb. 5, 12, 19 – no class, Feb. 26, March 5, 12.

"Time Series – 2 modules" – Instructor Janet Box-Steffensmeier, John Freeman, Jon Pevehouse
Fridays 12 pm – 2 pm EST, 11 am – 1 pm CST
Email: Steffensmeier.2@osu.edu; freeman@umn.edu; Pevehouse@polisci.wisc.edu

Description: This course studies statistical techniques used to analyze social processes occurring through time. We begin by discussing social problems that are inherently dynamic in nature and also how time series are measured. We then review the calculus of finite differences. We move next to the study stationary ARMA models, "reduced form" methods (granger causality and vector autogression), unit root tests, near-integration, fractional integration, cointegration, and error correction models. Time series regression is

briefly discussed. We address not only how to construct these models but also how to use time series models in social science analyses.

DATES: Jan. 24, 31, Feb. 7, 14, 21, 28, March 7 – no class, March 14, 21, 28, April 4 – no class/meet at MPSA, April 11, April 18 – no class, April 25, May 2.

2012-2013 ITV Course Schedule

Fall 2012:

"Statistical Computing"- Tam Cho
Wednesdays: 2:30-4:30 pm EST, 1:30-3:30 pm CST
Email: wendy@cho.pol.uiuc.edu
Course Syllabus

Description: This course will focus on aspects of statistical computing. Modern statistical packages provide many tools for analyzing data. One purpose of this course is to experience the power afforded by moving away from a simple point-and-click environment. We will learn & use basic programming skills to explore how statistical analysis is enhanced through simulation techniques like cross-validation, bootstrapping, & Monte Carlo experiments. Although there are no formal prerequisites for this course, students should be conversant with some statistical software package & linear models. We will primarily utilize the R statistical package.

Dates: Sept 12, 19, 26, Oct 3, 10 – no class, 17, 24, 31.

"Event History "- Box-Steffensmeier
Fridays: 12:00pm-2:00 pm EST, 11:00am-1:00 pm CST
Email: steffensmeier.2@polisci.osu.edu
Course Syllabus

Description: Event history methods are ideal for studying temporal change. They address not only whether an event occurred, but when the event occurred. For many research questions in social science, the timing or history of social change is as interesting as understanding the culminating event. Research designs incorporating "history" into the analysis promises greater analytical leverage than other designs. Inferences can be made regarding the influence of the covariates on the length of the duration & the occurrence (or nonoccurrence) of some event. The course will thoroughly describe different models for duration data, document the assumptions underlying the models, & consider goodness-of-fit indices & diagnostic techniques.

Dates: Sept. 7, 14, 21, 28, Oct. 5, 12, 19.

"Political Experiments: Design & Analysis – I "- Bowers, with McConnaughy
Fridays: 12:00pm-2:00 pm EST, 11:00am-1:00 pm CST
Email: jwbowers@illinois.edu
Course Syllabus I

Description: Randomized interventions allow political scientists to claim that comparisons are causal: randomization allows us the ability to characterize counterfactual comparisons - to say how the treated group would have responded had treatment been withheld. Randomization also allows us to test hypotheses about causal comparisons without requiring large samples or probability models of outcomes. Randomized experiments thus promise to simplify our lives and to enable clear answers to important

substantive and theoretical questions without requiring much in the way of extraneous justification. Yet, there is an art in designing and analyzing a randomized experiment. Only the simplest of experiments can be analyzed simply. And, in political science, we may not be able to directly require subjects to be exposed to a dose of our treatment and may need to work indirectly, using the randomization as an instrument to manipulate a dose, perhaps at a distance, perhaps weakly. In this course, we will practice designing experiments and making statistical inferences from the resulting data. Building on the most basic foundations (what is an experiment? why randomize?) we will engage with questions about clustered assignment, blocking, multi-valued treatments, and instrumental variables. Our hope is to prepare students to face their own design and analysis decisions of lab and field experiments with creativity and with a strong foundation in the design and statistical literatures on these topics.

Dates: Oct. 26, Nov. 2, 9, 16, 23 – no class, 30, Dec. 7, 14.

Spring 2013:

"Political Experiments: Design & Analysis – II "- McConnaughy, with Bowers
Wednesdays: 2:30pm-4:30 pm EST, 1:30pm-3:30 pm CST
Email: mcconnaughy.3@polisci.osu.edu
Course Syllabus II

Description: See Part I above

Dates: Jan. 23, 30, Feb. 6, 13, 20, 27, March 6.

"Formal Models of International Relations "- Kydd
Fridays: 12:00pm-2:00 pm EST, 11:00am-1:00 pm CST
Email: kydd@wisc.edu

Description: The purpose of this course is to survey applications of game theory to international relations and further develop students' game theoretic modeling skills. Students should have some familiarity with both game theory and international relations theory. The course is organized loosely by substantive topic. We will cover cooperation, bargaining, the origins and termination of war, multilateral politics, and the impact of domestic politics on international relations. The main project will be a paper containing a model. Two drafts of the paper will be handed in and graded independently. In addition there will be a few problem sets.

Dates: Jan. 25, Feb. 1, 8, 15, 22, Mar. 1, 8, (Mar. 15, 22, 29 – no class), Apr. 5, 12, 19, 26, May 3, 10.

"Multilevel Modeling"- Rudolph
Wednesdays: 2:30-4:30 pm EST, 1:30-3:30 pm CST
Email: rudolph@uiuc.edu
Course Syllabus

Description: Social science data frequently have a hierarchical or multilevel structure. In survey research, for example, we collect individual-level data on each respondent. We may have information about respondents' party identification, race, education, and voting behavior. Depending on the design of the survey, these respondents can often be grouped into a larger unit such as a county, state, or nation. We may have data concerning the characteristics of these higher-order units such as racial diversity, income inequality, or type of government institutions. While multilevel data present great theoretical opportunities, they also pose some statistical challenges. Hierarchical linear models are designed to meet these challenges and enable the analyst to exploit multilevel data structures for theoretical gain.

This course provides an introduction to the use of hierarchical or multilevel models. The purpose of the course is to introduce students to the basic principles and applications of hierarchical linear modeling in

political science research. Topics covered include an introduction to multilevel analyses, random intercept models, random slope models, hypothesis testing, hierarchical models for limited dependent variables, model fitting, and three-level models.

Dates: March 27, April 3, April 10, April 17, April 24, May 1, May 8

2011-2012 ITV Course Schedule

Fall 2011:

"Potential Outcomes/Matching"- Bowers
Wednesdays: 2:30-4:30 pm EST, 1:30-3:30 pm CST

Email: jwbowers@illinois.edu

Dates: Sept. 28, Oct 5, Oct 12, Oct 19, Oct 26 - no class, Nov 2, Nov 9, Nov 16

"Questionnaire Design" - Miller
Fridays: 12-2 pm EST, 11 am-1 pm CST

Email: mille441@umn.edu

Dates: Sept 23, Sept 30, Oct 7, Oct 14, Oct 21, Oct 28, Nov 4

Winter and Spring 2012:

"Spatial Econometrics" - Tam Cho
Wednesdays: 2:30-4:30 pm EST, 1:30am-3:30 pm CST

Email: wendy@cho.pol.uiuc.edu

Dates: Jan 25, Feb 1, Feb 8, Feb 15, Feb 22, Feb 29, Mar 7

"Time Series - 2 modules" - Box-Steffensmeier, Freeman, and Pevehouse
Fridays: 12-2 pm EST, 11 am-1 pm CST

Email: steffensmeier.2@polisci.osu.edu, pevehous@polisci.wisc.edu, freeman@umn.edu

Dates: Jan 27, Feb 3, Feb 10, Feb 17, Feb 24, Mar 2, Mar 9, Mar 16 - no class, Mar 23, Mar 30, April 6 - no class, April 13 - no class, meet at MPSA, April 20, April 27, May 4

2010-2011 ITV Course Schedule

Fall 2010:

"Multilevel Modeling" - Tom Rudolph
Wednesdays: 2:30-4:30 EST, 1:30-3:30 CST

Email:

Dates: Sept 29, Oct. 6, 13, 20, Oct. 27 – No Class, Nov. 3, 10, 17

Spring 2011:

"Event History" - Box-Steffensmeier
Fridays: 12-2pm EST, 11am-1pm CST

Email: steffensmeier.2@polisci.osu.edu
Dates:
Jan 21, 28, Feb 4, 11, 18, 25, March 4 - No Class, March 11

2009-2010 ITV Course Schedule

Fall 2009:

"Questionnaire Design" - Joanne Miller
Fridays: 12-2 EST, 11am-1pm CST
Email: jmiller@polisci.umn.edu
Dates:
Sept 25, Oct. 2, 9, 16 Oct. 23 – Break, No Class, Oct. 30, Nov. 6, 13

Spring 2010:

"Time Series - 2 modules" - Box-Steffensmeier, Freeman, and Pevehouse,
Fridays: 12-2pm EST, 11am-1pm CST
Email: steffensmeier.2@polisci.osu.edu
Dates:
Jan 22, 29, Feb 5, 12, 19, 26, March 5, March 12, March 19, 26 – Break, No Class
April 2, April 9, 16, April 23 – MPSA, April 30, May 7

"Topics in Statistical Graphics and Visualization" (Early Spring) - Franklin
Wednesdays: 2:30-4:30pm EST, 1:30-3:30pm CST
Email: franklin@polisci.wisc.edu
Dates:
Jan. 20, 27, Feb. 3, 10, Feb. 17 – Break, No Class, Feb. 24, March 3, 10

"Nonparametric and Robust Estimation" (Late Spring) - Keele,
Wednesdays: 2:30-4:45pm EST, 1:30-3:45pm CST
Email: keele.4@polisci.osu.edu
Dates:
March 31, April 7, 14, 21, 28, May 5

Course Descriptions

Questionnaire Design
Fall 2009

Instructor: Joanne Miller, University of Illinois
Fridays: 12-2pm EST, 11am-1pm CST
Email: jmiller@polisci.umn.edu
Dates:

Description: This course offers a review of some of the major theoretical and empirical issues associated with survey questionnaire design and prepares students in the fundamental skill areas necessary to design their own surveys and critique existing questionnaires.

Time Series - 2 modules
Spring 2010

Instructor: Box-Steffensmeier, Freeman, and Pevehouse, University of Illinois
Email: steffensmeier.2@polisci.osu.edu
Fridays: 12-2pm EST, 11am-1pm CST
Dates:

Description: This course considers statistical techniques to evaluate social processes occurring through time. The course introduces students to time series methods and to the applications of these methods in political science. After a brief review of the calculus of finite differences and other estimation techniques, we study stationary ARMA models. In the next section of the course, we examine a number of important topics in time series analysis including "reduced form" methods (granger causality and vector autogression), unit root tests, near-integration, fractional integration, cointegration, and error correction models. Time series regression is also discussed (including pooling cross-sectional and time series data). We learn not only how to construct these models but also how to use them in policy analysis. We expect students to have a firm grounding in probability and regression analysis and to bring to the course some interesting questions about the dynamics of political processes. The emphasis throughout the course will be on application, rather than on statistical theory. However, the focus of most lectures will be statistical theory. Homework will revolve as much as possible around the time series you are interested in understanding. To that end, students will need to gather time series data for analysis during the first week of class (this data need not be used throughout the term, though that would make your life easier). The length of the series should be at least 40 time points; longer series are better than shorter ones.

Topics in Statistical Graphics and Visualization
Spring I 2010

Instructor: Charles Franklin, University of Wisconsin
Email: franklin@polisci.wisc.edu
Wednesdays: 2:30-4:30pm EST, 1:30-3:30pm CST
Dates:

Description: Data visualization has become increasingly important in all areas of statistics, business, science and the social sciences. Yet it is hardly touched upon in standard statistics courses and few opportunities exist for an entire course devoted to the subject. We aim to change that. This course will focus on developing visualizations for 1-d, 2-d, 3-d, 4-d and (yes!) 5-d data and models. We will use R as the visualization tool along with the Lattice and other packages plus develop some original visualization techniques. We will also read widely in the growing visualization field, from Tufte's classics to modern computer science techniques. The goal of the course is to develop methods that allow us to understand our data and models better, and to communicate that understanding to readers through graphical techniques. Previous experience with R is highly recommended along with a good understanding of standard statistical modeling such as linear models and models for limited dependent variables. The "product" of the course will be weekly applications in which students develop original displays of interesting datasets and models. A final paper should delve more deeply into a particular visualization challenge such as high dimensional data, or discrete data or animation techniques.

Nonparametric and Robust Estimation
Spring II 2010

Instructor: Luke Keele, Ohio State University
Email: keele.4@polisci.osu.edu
Wednesdays: 2:30-4:30pm EST, 1:30-3:30pm CST
Dates:

Description: This course is designed to introduce graduate students to a variety of advanced and computationally intensive methods that are starting to be used regularly in the field. The class will familiarize students with such topics as bootstrapping, non-parametric and semi-parametric estimation, and robust estimation. The topics in this class are not standard fare in the typical methods sequence, but are appearing with increasing frequency in applied work, and in many cases should be used more often. The course will be run more along the lines of a workshop, and it is hoped that there will be extensive interaction during class as we review the methods covered here.

2008-2009 ITV Course Schedule

Fall:

"Multilevel Modeling" - Tom Rudolph, broadcasting from the Univ. of IL
Fridays: 12-2pm EST, 11am-1pm CST
Email: rudolph@uiuc.edu

Spring:

"Spatial Modeling" - Jude Hays, broadcasting from the Univ. of IL
Fridays: 12-2pm EST, 11am-1pm CST
Email: jchays@uiuc.edu

"Introduction to Bayesian Methods" - Charles Franklin, broadcasting from the Univ. of Wisc.

Wednesdays: 2:30-4:30pm EST, 1:30-3:30pm CST
Email: franklin@polisci.wisc.edu

"Advanced Bayesian Methods" - Charles Franklin, broadcasting from the Univ. of Wisc.
Wednesdays: 2:30-4:30pm EST, 1:30-3:30pm CST
Email: franklin@polisci.wisc.edu

Course Descriptions

Multilevel Modeling

Instructor: Tom Rudolph, University of Illinois
Fridays: 12-2pm EST, 11am-1pm CST
Email: rudolph@uiuc.edu
Dates: Sept. 26, Oct. 3, Oct. 10, Oct. 17, NO CLASS on Oct. 24, Oct. 31, Nov. 7, Nov. 14

Description:

Social science data frequently have a hierarchical or multilevel structure. In survey research, for example, we collect individual-level data on each respondent. We may have information about respondents' party identification, race, education, and voting behavior. Depending on the design of the survey, these respondents can often be grouped into a larger unit such as a county, state, or nation. We may have data concerning the characteristics of these higher-order units such as racial diversity, income inequality, or type of government institutions. While multilevel data present great theoretical opportunities, they also pose some statistical challenges. Hierarchical linear models are designed to meet these challenges and enable the analyst to exploit multilevel data structures for theoretical gain.

This course provides an introduction to the use of hierarchical or multilevel models. The purpose of the course is to introduce students to the basic principles and applications of hierarchical linear modeling in political science research. Topics covered include an introduction to multilevel analyses, random intercept models, random slope models, hypothesis testing, hierarchical models for limited dependent variables, model fitting, and three-level models.

Spatial Modeling

Instructor: Jude Hays, University of Illinois
Email: jchays@uiuc.edu
Fridays: 12-2pm EST, 11am-1pm CST
Dates:
Jan. 23, Jan. 30, Feb. 6, Feb. 13, Feb. 20 -- NO Class -- just take a week off
Feb. 27, March 6, March 13

Description:

Spatial interdependence is ubiquitous in politics. The likelihood and outcomes of demonstrations, riots, coups, and revolutions in one country almost certainly depend on such occurrences in other countries. Election outcomes, candidate qualities or strategies in some contests surely depend on those in others, and individual legislators' votes certainly depend on others' votes or expected votes. In micro-behavioral research, contextual or network

effects usually refer to the effects on each individual's behavior or opinion from sets of other individuals' opinions or behavior. States' entry decisions in wars, alliances, and international organizations depend on how many and who enter and how. Globalization implies strategic and non-strategic interdependence in national-level macroeconomic policymaking. This course provides an introduction to spatial and spatio-temporal models for continuous and limited dependent variables with an emphasis on political science applications. Participants will learn how to estimate the structural parameters of spatial and spatio-temporal regression models, calculate and present the implied spatial and spatio-temporal effects, and use spatial modeling to evaluate the nature of interdependence (e.g., strategic free-riding behaviour, learning, coercion) among their units of observation.

Introduction to Bayesian Analysis (Spring I)

Instructor: Charles Franklin, University of Wisconsin
Email: franklin@polisci.wisc.edu
Wednesdays: 2:30-4:30pm EST, 1:30-3:30pm CST
Dates:
Jan. 21, Jan. 28, Feb. 4, Feb. 11, Feb. 18, Feb. 25, March 4

Description:

This course introduces Bayesian methods for data analysis in the social sciences. Bayesian methods provide a flexible and powerful approach to complex statistical models and have a theoretical elegance and clarity that is impressive. Bayesian models inherently recognize and incorporate subjective judgments of the researcher, which is the source of both their great power the controversy surrounding their use. We will discuss some of the epistemological issues raised by Bayesian methods as well as their application. We will cover the basic concepts of Bayesian statistical inference. There are several sets of tools needed to do applied Bayesian modeling. First we need to review some probability theory. Second, we will develop the fundamental notion of Bayes theorem as a foundation for statistical inference. We'll also see how likelihood is incorporated within the Bayesian framework. Finally, we'll explore the world of applied Bayesian modeling. This will include learning some new software tools using WinBugs and S-Plus/R. The main focus of the course will be application of Bayesian models to cutting edge issues in social science modeling. This will include a number of applied readings. We'll take time to discuss these applications in class in order to develop a feel for what research that takes a Bayesian approach "feels" like.

The goal of the class is to develop the necessary theoretical understanding to correctly apply Bayesian models using modern software. A second goal is to reach a level of understanding that will support further reading and learning on your own. The syllabus points the way to further reading throughout in the "Advanced Topics" sections.

Advanced Bayesian Analysis (Spring II)

Instructor: Charles Franklin, University of Wisconsin
Email: franklin@polisci.wisc.edu
Wednesdays: 2:30-4:30pm EST, 1:30-3:30pm CST
Dates:
April 1, April 8, April 15, April 22, April 29, May 6

2007-2008 ITV Course Schedule

"Nonparametric and Robust Estimation" - Luke Keele
Fridays: 11:00- 1:00 CST
Email: keele.4@polisci.osu.edu

"Potential Outcomes Inference" - Jake Bowers
Wednesdays: 1:30- 3:30 CST
Email: jwbowers@umich.edu

Spring:

"Time Series" - Jan Box-Steffensmeier, John Freeman and Jon Pevehouse
Fridays: 11:00-1:00 CST
Email: steffensmeier.2@osu.edu
Email: pevehouse@polisci.wisc.edu

Course Descriptions

Nonparametric Robust Estimation

Instructor: Luke Keele, Ohio State University
Email: keele.4@polisci.osu.edu
Times: 11:00am - 1:00pm CST, Fridays

Dates: Sept 21, Sept 28, Oct 5th, Oct 19th, Oct 26th, Nov 2nd, and Nov 9th (all Fridays)

Description:

This course is designed to introduce graduate students to a variety of advanced and computationally intensive methods that are starting to be used regularly in the field. The class will familiarize students with such topics as bootstrapping, non-parametric and semi-parametric estimation, and robust estimation. The topics in this class are not standard fare in the typical methods sequence, but are appearing with increasing frequency in applied work, and in many cases should be used more often. The course will be run more along the lines of a workshop, and it is hoped that there will be extensive interaction during class as we review the methods covered here.

Potential Outcomes Inference

Instructor: Jake Bowers, University of Illinois
Email: jwbowers@umich.edu
Times: 1:30pm - 3:30pm CST, Wednesdays

Dates: Sept 26, Oct 3, Oct 10, Break, Oct 24, Oct 31,Nov 7, Nov 14 (all Wednesdays)

Description:

The potential outcomes approach to causal inference (invented by Neyman, developed by Rubin) emphasizes research design and conceptual definition of a causal estimand over concerns with properties of estimators (e.g.

consistency, unbiasedness) or over concerns about the chance processes that may have led to a particular observed outcome (e.g. frequentist hypothesis testing or bayesian posterior inference). Starting from an understanding of how to think abut causal effects one is soon led to (1) choose particular data analytic techniques (such as propensity scores and matching) over others (such as linear models with long lists of "control" variables) and (2) understand old techniques in new light (such as understanding what assumptions are required for us to believe $\hat{\beta_{OLS}}$ tells us something about causality).

In this course, we'll start by learning what a potential outcome is and how it can structure our thinking about causal inference. Then we'll move on to learn about tools for making such inferences, such as matching, propensity scores, and OLS regression. As we learn about these different techniques for "controlling for confounds" and for estimating causal effects, we'll also learn about how to answer the question "Could this effect be due to chance?" using "standard" hypothesis testing (i.e. Neyman-style model based inference), as well as Bayesian predictive inference, and Fisher-style permutation or randomization inference.

Assignments can be completed in any programming language that is scriptable, as long as the code used to complete the assignments is submitted in a form that the teaching staff can submit for interpretation to a program all at once (i.e. a ".do" file, or an ".R" or ".Rnw", or even a ".c" file). The instructor will exclusively use R and will provide R code for all of the examples discussed in class.

Time Series

Instructors:
Jan Box-Steffensmeier, Ohio State University
John Freeman, University of Minnesota
Jon Pevehouse, University of Wisconsin-Madison
Emails: steffensmeier.2@osu.edu
freeman@umn.edu
pevehouse@polisci.wisc.edu
Times: 11:00am - 1:00pm CST, Fridays

Dates: Jan 25, Feb 1, Feb 8, Feb 15, Feb 22, Feb 29, Mar 7, Mar 14, Apr 4, Apr 11, Apr 18, Apr 25, May 2 (all Fridays)

Description:

This course considers statistical techniques to evaluate social processes occurring through time. The course introduces students to time series methods and to the applications of these methods in political science. After a brief review of the calculus of finite differences and other estimation techniques, we study stationary ARMA models. In the next section of the course, we examine a number of important topics in time series analysis including "reduced form" methods (granger causality and vector autogression), unit root tests, near-integration, fractional integration, cointegration, and error correction models. Time series regression is also discussed (including pooling cross-sectional and time series data). We learn not only how to construct these models but also how to use them in policy analysis.

We expect students to have a firm grounding in probability and regression analysis and to bring to the course some interesting questions about the dynamics of political processes. The emphasis throughout the course will be on application, rather than on statistical theory. However, the focus of most lectures will be statistical theory. Homework will revolve as much as possible around the time series you are interested in understanding. To that end, students will need to gather time serial data for analysis during the first week of class (this data need not be used throughout the term, though that would make your life easier). The length of the series should be at least 40 time points; longer series are better than shorter ones.

This is the first part of a fourteen-week seminar team-taught by Professors John Freeman, Janet Box-Steffensmeier, and Jon Pevehouse. Students are strongly encouraged to take both parts of the course.

2006-2007 ITV Course Schedule

Fall:

"Questionnaire Design" - Joanne Miller
Fridays: 11:00- 1:00 CST
Email: jmiller@polisci.umn.edu

"Multilevel Modeling" - Tom Rudolph
Wednesdays: 1:30- 3:30 CST
Email: rudolph@uiuc.edu

Spring:

"Bayesian Analysis" - Charles Franklin
Wednesdays: 1:30- 3:30 CST
Email: franklin@polisci.wisc.edu

"Event History" - Jan Box-Steffensmeier
Fridays: 11:00-1:00 CST
Email: steffensmeier.2@osu.edu

Course Descriptions

Survey Questionnaire Design

Instructor: Joanne Miller, University of Minnesota
Email: jmiller@polisci.umn.edu
Times: 11:00am - 1:00pm CST, Fridays

Dates:

Sept 29, Oct. 6, Oct. 13, Oct. 20th, Oct. 27, Nov. 3rd, Nov. 17th (Note that Nov. 10th is a day without class. OSU is closed that day (Veteran's Day I believe). Fridays 11:00- 1:00 CST,

Description:

This course offers a review of some of the major theoretical and empirical issues associated with survey questionnaire design and prepares students in the fundamental skill areas necessary to design their own surveys and critique existing questionnaires.

Syllabus

Required Textbook: Schuman, Howard, and Stanley Presser. 1996. Questions and Answers in Attitude Surveys. CA: Sage. ISBN: 0-7619-0359-3

Multilevel Modeling

Instructor: Tom Rudolph, University of Illinois
Email: rudolph@uiuc.edu
Times: 1:30pm - 3:30pm CST, Wednesdays

Dates:

Sept. 27, Oct. 4, Oct. 11, Oct. 18, Nov. 1, Nov. 8, Nov. 15 (Note that I have Oct. 25 as a day without class. the 7 weeks flies by and we have generally found it useful to take a deep breath a bit over midway in the course.) Wednesdays 1:30- 3:30 CST,

Description:

Social science data frequently have a hierarchical or multilevel structure. In survey research, for example, we collect individual-level data on each respondent. We may have information about respondents' party identification, race, education, and voting behavior. Depending on the design of the survey, these respondents can often be grouped into a larger unit such as a county, state, or nation. We may have data concerning the characteristics of these higher-order units such as racial diversity, income inequality, or type of government institutions. While multilevel data present great theoretical opportunities, they also pose some statistical challenges. Hierarchical linear models are designed to meet these challenges and enable the analyst to exploit multilevel data structures for theoretical gain.

This course provides an introduction to the use of hierarchical or multilevel models. The purpose of the course is to introduce students to the basic principles and applications of hierarchical linear modeling in political science research. Topics covered include an introduction to multilevel analyses, random intercept models, random slope models, hypothesis testing, hierarchical models for limited dependent variables, model fitting, and three-level models.

Syllabus

Required Textbook:

Snijders, Tom, and Roel Bosker. 1999. Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling. Sage Publications.

Event History

Instructor: Jan Box-Steffensmeier, Ohio State University
Email: steffensmeier.2@osu.edu
Times: 11:00am - 1:00pm CST, Fridays

Dates:

Feb. 9, Feb. 16, Feb. 23, March 2, March 9, March 30, April 6. Fridays 11:00-1:00 CST,

Description:

Social science theories are increasingly focused on change processes and temporal data are becoming widely available. Event history methods are ideal for studying temporal change. They address not only whether an event occurred, but when the event occurred. For many research questions in social science, the timing or history of social

change is at least as interesting as understanding the culminating event. Research designs incorporating "history" into the analysis promises greater analytical leverage than other designs.

Event history analysis is longitudinal and involves the statistical examination of longitudinal data collected on a set of observations. While a wide variety of statistical models may be constructed for event history data, at the most basic level, all event history models have some common features. The dependent variable measures the duration of time that units spend in a state before experiencing some event. Generally, a researcher knows when the observations enter the process, i.e., when the history begins, and when, and whether or not, the process ends (with the occurrence or nonoccurrence of some event). Analysts are typically interested in the relationship between the length of the observed duration and independent variables, or covariates, of theoretical interest. A statistical model can then be constructed to link the dependent variable to the covariates. Inferences can be made regarding the influence of the covariates on the length of the duration and the occurrence (or nonoccurrence) of some event.

These methods have many advantages and allow new questions to be addressed. Event history data are becoming more available in all areas of empirically oriented political science. Applications include the duration of peace, the duration of unemployment, the length of time a cabinet is in place, when a challenger enters a congressional race, the duration of congressional careers, when a policy is likely to be adopted by the states, or how long it takes to complete a dissertation. The course will thoroughly describe different models for different kinds of duration data, document the assumptions underlying these different models, and consider goodness-of-fit indices and diagnostic techniques, i.e., residual and specification analysis.

Bayesian Analysis

Instructor: Charles Franklin, University of Wisconsin
Email: franklin@polisci.wisc.edu
Times: 1:30-3:30, Wednesdays

Dates:

Feb 7, Feb. 14, Feb. 21, Feb. 28, March 7, March 28, April 4 (The dates off are March 14 and 21 due to spring breaks at the various schools. MPSA is the following week, April 12-15, too.) Wednesdays 1:30- 3:30 CST,

Description:

This course introduces Bayesian methods for data analysis in the social sciences. Bayesian methods provide a flexible and powerful approach to complex statistical models and have a theoretical elegance and clarity that is impressive. Bayesian models inherently recognize and incorporate subjective judgments of the researcher, which is the source of both their great power the controversy surrounding their use. We will discuss some of the epistemological issues raised by Bayesian methods as well as their application. We will cover the basic concepts of Bayesian statistical inference. There are several sets of tools needed to do applied Bayesian modeling. First we need to review some probability theory. Second, we will develop the fundamental notion of Bayes theorem as a foundation for statistical inference. We'll also see how likelihood is incorporated within the Bayesian framework. Finally, we'll explore the world of applied Bayesian modeling. This will include learning some new software tools using WinBugs and S-Plus/R.

The main focus of the course will be application of Bayesian models to cutting edge issues in social science modeling. This will include a number of applied readings. We'll take time to discuss these applications in class in order to develop a feel for what research that takes a Bayesian approach "feels" like. The goal of the class is to develop the necessary theoretical understanding to correctly apply Bayesian models using modern software. A second goal is to reach a level of understanding that will support further reading and learning on your own. The syllabus points the way to further reading throughout in the "Advanced Topics" sections.

2005-2006 ITV Course Schedule

Fall:

"Panel Data Analysis" - Brian Gaines
Wednesdays: 1:30-3:30 CST
Schedule: Oct. 12, 19, 26 Nov. 9, 16, 30 Dec. 7 (Off Nov. 2 and 23)
Email: bjgaines@uiuc.edu

Winter:

"Time Series, Introduction" - Jan Box-Steffensmeier, John Freeman and Jon Pevehouse
Fridays: 11:00-1:00 CST
Schedule: Jan. 20, 27, Feb. 3, 10, 17, 24 Mar. 3
Email: steffensmeier.2@osu.edu
Email: freeman@polisci.umn.edu
Email: pevehouse@polisci.wisc.edu

Spring:

"Time Series, Advanced" - Jan Box-Steffensmeier, John Freeman and Jon Pevehouse
Fridays: 11:00-1:00 CST
Schedule: Mar. 10, 17, 31 April 7, 14, 28 May 5 (Off Mar. 24 and April 21)
Email: steffensmeier.2@osu.edu
Email: freeman@polisci.umn.edu
Email: pevehouse@polisci.wisc.edu

Course Descriptions

Panel Data Analysis

Instructor: Brian Gaines, University of Illinois Urbana-Champaign
Email: bjgaines@uiuc.edu
Syllabus: pdf version
Times: 1:30 - 3:30 CST, Wednesdays
Autumn Schedule:
Oct. 12, 19, 26
Nov. 9, 16, 30
Dec. 7

Class Notes

Description:

This course will introduce the very large and rapidly growing statistical literature on analyzing data in which observations are a cross section of some units (e.g. individuals, countries, states, firms) over multiple time periods. I

will use "panel data" in a broad sense to mean any data spanning multiple dimensions, usually (but not necessarily) time and space. I will not explicitly restrict attention to cases in which we have much larger *N*s than *T*s, as is sometimes done. In general terms, the advantage to having time and space variance is that one can avoid inferring that inter-personal differences across units are equivalent to inter-temporal differences within units. For instance, in a cross-section if we find that age is a significant predictor of voting, we often infer that this result implies a forecast that all members of the relevant population will vote with increasing probability as they age. From a time series on just one unit, we might make the companion inference: that an observed life-cycle change in one unit implies across-age variation in a population that is heterogeneous in age in any given time period. With data that vary on both dimensions, one can better disentangle inter-unit and inter-temporal variance, and thus, in many contexts, adjudicate between rival behavioral theories. The increasing availability of large data sets and powerful computers has made panel models more and more prominent in social science data analysis.

None of the ITV classes assume any specialized skills or prerequisites beyond familiarity with classic regression and a degree of comfort with matrix calculations. In a perfect world, one might study both maximum likelihood estimation and time series analysis in advance of panel data models, but I will not assume that students have followed that particular sequence. I'll briefly review some results in matrix algebra early in the course to setup exposition of models thereafter, so familiarity with matrix computations will be helpful ("familiarity with" need not be read as "mastery of".)

In seven weeks, we cannot possibly cover even a full introductory text, let alone the whole field, so I must emphasize the first word in the title: this course should be regarded as only a first step. We will mainly work out of Baltagi's *Econometric Analysis of Panel Data* 3rd Edition (Wiley, 2005), but I'll also borrow from Cheng Hsiao's *Analysis of Panel Data* (Cambridge, 2003) and *Longitudinal and Panel Data* by Edward Frees (Cambridge, 2004). (The 3rd ed. of Baltagi is quite new and goes for about $80, getting a used copy of the 2nd ed. instead shouldn't be disastrous. Hsaio's book is a much better deal, at about $30, and also a fine reference. The Frees book goes for about $40.) A few political science applications will be added, and we'll deal with computing issues at least briefly. However, the course will probably, given its brevity and introductory nature, emphasize theory at the expense of practice.

1. Wed 12.10: Introduction, Preliminaries, Analysis of Variance
2. Wed. 19.10: ANCOVA, Fixed Effects
3. Wed. 26.10: Random Effects

   -- Wed. 02.11: NO CLASS

4. Wed. 09.11: Hypothesis Tests
5. Wed. 16.11: Heteroskedasticity, Serial Correlation

   -- Wed. 23.11: NO CLASS (THANKSGIVING BREAK)

6. Wed. 30.11: Dynamic Models
7. Wed. 07.12: TBD (possible guest lecture)

An additional caveat is that this will be only the second time I've given this class, and I'll be continuing to experiment in what to cover, level of detail, and so on.

The evaluands will be a couple of problem sets plus a short paper. The paper is meant to be a research note, a short (7-12 pages) work that is built around a panel data analysis. My intention is to give students carte blanche on topic so that everyone can work on a project that will be useful to them beyond fulfilling a course requirement. As the class proceeds, each student should keep me abreast of their plans, their success is obtaining the necessary data, and so on.

We'll definitely spend some time in later sessions discussing applications and articles, and those will either be readily accessible (e.g. at JSTOR) or circulated in advance. Lecture notes will generally be available in advance of

the class, though I may sometimes post items after the lecture in question as well. The precise URL will be forthcoming, but it will be connected to the main ITV webstite:

Time Series Analysis

Instructors:
Jan Box-Steffensmeier, The Ohio State University
email: steffensmeier.2@osu.edu
John Freeman, University of Minnesota
email: freeman@polisci.umn.edu
Jon Pevehouse, University of Wisconsin
email: pevehous@polisci.wisc.edu
Syllabus: Download the syllabus
Times: 11:00-1:00 CST, Fridays
Winter Schedule:
January 20, 27
February 3, 10, 17, 24
March 3
Spring Schedule:
March 10, 17, 31
April 7, 14, 28
May 5

Description:

This course considers statistical techniques to evaluate social processes occurring through time. The course introduces students to time series methods and to the applications of these methods in political science. After a brief review of the calculus of finite differences and other estimation techniques, we study stationary ARMA models. In the next section of the course, we examine a number of important topics in time series analysis including "reduced form" methods (granger causality and vector autogression), unit root tests, near-integration, fractional integration, cointegration, and error correction models. Time series regression is also discussed (including pooling cross-sectional and time series data). We learn not only how to construct these models but also how to use them in policy analysis.

We expect students to have a firm grounding in probability and regression analysis and to bring to the course some interesting questions about the dynamics of political processes. The emphasis throughout the course will be on application, rather than on statistical theory. However, the focus of most lectures will be statistical theory. Homework will revolve as much as possible around the time series you are interested in understanding. To that end, students will need to gather time serial data for analysis during the first week of class (this data need not be used throughout the term, though that would make your life easier). The length of the series should be at least 40 time points; longer series are better than shorter ones.

This is the first part of a fourteen-week seminar team-taught by Professors John Freeman, Janet Box-Steffensmeier, and Jon Pevehouse. Students are strongly encouraged to take both parts of the course.

2004-2005 ITV Course Schedule

SPRING I:

"Spatial Data Modeling" - David Darmofal
Fridays: 11:00-1:00 CST
Schedule: Jan. 21, 28, Feb. 4, 11, 25, Mar. 4, 11
Email: darmofal.3@osu.edu

"Event History" - Jan Box-Steffensmeier
Weds: 1:30-3:30 CST
Schedule: Jan. 19, 26, Feb. 2, 9, 23, Mar. 2, 9
Email: steffensmeier.2@osu.edu

Course Descriptions

Spatial Data Modeling

Instructor: David Darmofal, Senior PRISM Fellow at Ohio State University
Email: darmofal.3@osu.edu
Time: 11:00am - 1:00pm CST, Fridays
Spring I Schedule:
January 21, 28
February 4, 11 (NO CLASS February 18), 25
March 4, 11

Description:

This course introduces students to modeling techniques for spatial data. Many of our models in political science (e.g., of policy diffusion, interstate conflict, and political communication) posit that spatial context shapes political behavior: the behavior of observed units is influenced by units in close proximity. Recent advances in spatial econometrics combine with the growing availability of geo-coded data to allow for much more rigorous testing of spatial influences on political behavior than has previously been possible.

Spatial econometrics remain an important tool for political scientists even when behavior is purely atomistic, and is not shaped by social context. Atomistic neighbors' shared values on omitted variables can induce spatially autocorrelated errors, producing inefficient OLS estimates, biased standard errors, and erroneous inferences on covariates of substantive interest. Spatial econometric models are able to correct for these spatially autocorrelated errors.

The course will begin by examining the problems that spatial autocorrelation (a systematic relationship between values on a variable of interest and geographic location) poses for standard approaches to statistical inference. Next, we will consider global tests of spatial autocorrelation, as well as local indicators of spatial association (LISA) statistics, such as Moran's I and Geary's c, which identify which observations are spatially autocorrelated. This portion of the course will also introduce students to geographic information systems (GIS) software, which is useful for many applications in political science.

Next, we will turn to strategies for modeling spatial dependence. Here, we will begin by considering the familiar OLS regression model as well as a set of spatial diagnostics that measure whether spatial autocorrelation persists in the presence of covariates in the OLS specification. Next, we will consider spatial econometric alternatives for modeling this spatial dependence. Here, we will focus on two principal classes of spatial regression models. Spatial lag models are applicable when spatial context shapes political behavior. Spatial lag models incorporate contextual influences via a spatially lagged dependent variable. Spatial error models are applicable for aspatial processes that are influenced by omitted variables. Here, the spatial dependence is modeled via a spatially lagged error term. We

will conclude the course by considering emerging frontiers in spatial econometrics, such as spatial models for limited dependent variables, space-time models, and Bayesian hierarchical models.

Students are expected to have previous training in probability theory and regression analysis. Students should also bring to the class some interesting questions about spatial influences on political behavior. Students will be encouraged to work with geo-coded data sets of their own choosing that allow for empirical analyses of spatial effects on political behavior.

Event History

Instructor: Jan Box-Steffensmeier, Ohio State University
Email: steffensmeier.2@osu.edu
Times: 1:30pm - 3:30pm CST, Wednesdays
Spring I Schedule:
January 19, 26
February 2, 9 (NO CLASS February 16),23
March 2, 9

Description:

Social science theories are increasingly focused on change processes and temporal data are becoming widely available. Event history methods are ideal for studying temporal change. They address not only whether an event occurred, but when the event occurred. For many research questions in social science, the timing or history of social change is at least as interesting as understanding the culminating event. Research designs incorporating "history" into the analysis promises greater analytical leverage than other designs.

Event history analysis is longitudinal and involves the statistical examination of longitudinal data collected on a set of observations. While a wide variety of statistical models may be constructed for event history data, at the most basic level, all event history models have some common features. The dependent variable measures the duration of time that units spend in a state before experiencing some event. Generally, a researcher knows when the observations enter the process, i.e., when the history begins, and when, and whether or not, the process ends (with the occurrence or nonoccurrence of some event). Analysts are typically interested in the relationship between the length of the observed duration and independent variables, or covariates, of theoretical interest. A statistical model can then be constructed to link the dependent variable to the covariates. Inferences can be made regarding the influence of the covariates on the length of the duration and the occurrence (or nonoccurrence) of some event.

These methods have many advantages and allow new questions to be addressed. Event history data are becoming more available in all areas of empirically oriented political science. Applications include the duration of peace, the duration of unemployment, the length of time a cabinet is in place, when a challenger enters a congressional race, the duration of congressional careers, when a policy is likely to be adopted by the states, or how long it takes to complete a dissertation. The course will thoroughly describe different models for different kinds of duration data, document the assumptions underlying these different models, and consider goodness-of-fit indices and diagnostic techniques, i.e., residual and specification analysis.

2003-2004 ITV Course Schedule

FALL I:

Charles Franklin -- "Bayesian Methods"
Weds. 1:30-3:30 CST

Sept. 10, 17, 24, Oct. 1, 8, 15, 22
Email: franklin@polisci.wisc.edu

FALL II:

Charles Franklin -- "Bayesian Methods II"
Weds. 1:30-3:30 CST
Oct 29, Nov. 5, 12, 19, 26, Dec. 3, 10
Email: franklin@polisci.wisc.edu

Herb Weisberg -- "Scaling and Dimensional Analysis"
Fridays, 11:00-1:00 CST
Oct 17, 24, 31, Nov. 7, 14, 21, Dec. 5
Email: weisberg.1@osu.edu

SPRING I:

Wendy Tam Cho -- "Statistical Computing"
Wednesdays, 1:30-3:30 CST
Jan. 21, 28, Feb. 4, 11, 18, 25, Mar. 3
E-mail: wendy@cho.pol.uiuc.edu

Jan Box-Steffensmeier, John Freeman, and Jon Pevehouse -- "Time Series Analysis"
Fridays 11:00-1:00 CST
Jan. 23, 30, Feb. 6, 13, 20, 27, Mar. 5
Email: steffensmeier.2@osu.edu, freeman@polisci.umn.edu, pevehous@polisci.wisc.edu

SPRING II:

Brian Gaines -- "Panel Data Analysis"
1:30-3:30 CST
Mar. 10, 31, Apr. 7, 14, 21, 28, May 5
Email: bjgaines@uiuc.edu

Jan box-Steffensmeier, John Freeman, and Jon Pevehouse -- "Time Series Analysis II"
Fridays, 11:00-1:00 CST
Mar. 12, Apr. 2, 9, 23, 30, May 7
Email: steffensmeier.2@osu.edu, freeman@polisci.umn.edu, pevehous@polisci.wisc.edu

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2003-2004 Course Descriptions

Bayesian Methods II

Instructor: Charles Franklin, University of Wisconsin
Email: franklin@polisci.wisc.edu
Times: 1:30 - 3:30 CST, Wednesdays
Fall I Schedule:

September 10, 17, 24
October 1, 8, 15, 22
Fall II Schedule:
October 29
November 5, 12, 19, 26
December 3, 10

Description:

This course introduces Bayesian methods for data analysis in the social sciences. Bayesian methods provide a flexible and powerful approach to complex statistical models and have a theoretical elegance and clarity that is impressive. Bayesian models inherently recognize and incorporate subjective judgments of the researcher, which is the source of both their great power the controversy surrounding their use. We will discuss some of the epistemological issues raised by Bayesian methods as well as their application. We will cover the basic concepts of Bayesian statistical inference. There are several sets of tools needed to do applied Bayesian modeling. First we need to review some probability theory. Second, we will develop the fundamental notion of Bayes theorem as a foundation for statistical inference. We'll also see how likelihood is incorporated within the Bayesian framework. Finally, we'll explore the world of applied Bayesian modeling. This will include learning some new software tools using WinBugs and S-Plus/R. The main focus of the course will be application of Bayesian models to cutting edge issues in social science modeling. This will include a number of applied readings. We'll take time to discuss these applications in class in order to develop a feel for what research that takes a Bayesian approach "feels" like.

The goal of the class is to develop the necessary theoretical understanding to correctly apply Bayesian models using modern software. A second goal is to reach a level of understanding that will support further reading and learning on your own. The syllabus points the way to further reading throughout in the "Advanced Topics" sections.

Texts:

- Andrew Gelman, John B. Carlin, Hal S. Stern and Donald B. Rubin. 1995. *Bayesian Data Analysis* . New York: Chapman & Hall.
- Jeff Gill. 2002. *Bayesian Methods for the Social and Behavioral Sciences* . New York: Chapman & Hall/CRC.

Scaling and Dimensional Analysis in Political Science

Instructor: Herb Weisberg, The Ohio State University
Email: weisberg.1@osu.edu
Times: 11:00 - 1:00 CST, Fridays
Fall II Schedule:
October 17, 24, 31
November 7, 14, 21, 28
December 5

Description:

Dimensional perspectives are common in thinking about politics. This course covers the methodology of dimensional analysis -- the scaling techniques and their philosophical implications. The dimensional approach is based in geometry, so visual displays will be emphasized. Theoretical perspectives on methods, scaling, and dimensions will also be presented. The methods presented are a variety of techniques for scaling, broadly defined, including unfolding analysis, proximity scaling, Guttman scaling, cluster analysis, factor analysis, and multidimensional scaling. These methods provide means for:

- data reduction (reducing a large number of variables into a smaller set of composites)
- examining dimensionality (representing the data in terms of the smallest possible number of unobserved underlying factors)
- measurement (scoring cases on the underlying dimensions and using those scores in further analysis)

The course will be presented as a "module" is part of an on-going program of graduate Interactive Television Program (ITV) in Advanced Political Methodology, a cooperative program by the Departments of Political Science on four CIC campuses (Illinois, Michigan, Ohio State, and Wisconsin) using interactive video and WebCT.

Requirements:

1. Students will be expected to use relevant computer programs and interpret the results.
2. A report (5 pages) on an article in your substantive field that uses the techniques treated in this class. Due: November 14.
3. A term paper analyzing a set of data of your choosing from a dimensional perspective, using whichever techniques are most appropriate. The best papers are generally those which use multiple dimensional techniques on the same data and compare the results. Due: Thursday December 4.
4. A takehome final exam will be given. Due: Wednesday December 10 at noon.

Required books:
No single textbook covers all of the topics in this course. The full-length books which have been written on these topics are generally out-of-print, partially out-of-date, very expensive, and/or overly mathematical. As a result, several paperbacks will be used in this course as text-substitutes:

- Abbott, Flatland (or Burger, Sphereland)

- Several Sage monographs on scaling:
    - Jacoby, *Data Theory and Dimensional Analysis* (Sage #78)
    - McIver & Carmines, *Unidimensional Scaling* (#24)
    - Kruskal & Wish, *Multidimensional Scaling* (#11)
    - Kim & Mueller, *Introduction to Factor Analysis* (#13)
    - Kim & Mueller, *Factor Analysis* (#14)
    - Long, *Confirmatory Factor Analysis* (#33)
    - Aldenderfer & Blashfield, *Cluster Analysis* (#44)

Statistical Computing

Instructor: Wendy Cho, University of Illinois
Email: wendy@cho.pol.uiuc.edu
Times: 1:30-3:30 CST, Wednesdays
Spring I Schedule:
January 21, 28, February 4, 11, 18, 25, Mar 3

Description:

This course will focus on aspects of statistical computing. Modern statistical packages provide many tools for analyzing data. One purpose of this course is to take a behind-the-scene look at some of these tools in an effort to move away from a simple point-and-click environment to a better understanding of some of these powerful tools. In addition, we will examine how advances in computing have led to advances in statistical analysis through tools such as simulation. A variety of statistical methods will be discussed in the context of specific data analysis problems. Topics may include distributions and random data, numerical methods, Monte Carlo experiments, and optimization (via e.g., maximum likelihood).

Although there are no formal prerequisites for this course, students should be comfortable using computers and should be conversant with some statistical software package. Although I prefer to do my work in a UNIX environment, you are welcome to work in either a UNIX environment or a windows environment. This course will emphasize the S-plus statistical package primarily through its free counterpart, R. Although I will not spend much time discussing implementation in other statistical package, you should feel free to use and complete assignments using any package that is appropriate for the tasks.

This syllabus as well as some class notes, announcements, and problem sets will be available at the web site http://cho.pol.uiuc.edu/ps493/ . This web site will be updated regularly as the course progresses. Data sets for the computer assignments and various other items of interest will also be available at the class web site.

Time Series Analysis

Instructors:
Jan Box-Steffensmeier, The Ohio State University
email: steffensmeier.2@osu.edu
John Freeman, University of Minnesota
email: freeman@polisci.umn.edu
Jon Pevehouse, University of Wisconsin
email: pevehous@polisci.wisc.edu
Syllabus: Download the syllabus
Times: 11:00-1:00 CST, Fridays
Spring I Schedule: January 23, 30, February 6, 13. 20, 27, Mar 5

Spring II Schedule: March 12, April 2, 9, 23, 30, May 7

Description:

This course considers statistical techniques to evaluate social processes occurring through time. The course introduces students to time series methods and to the applications of these methods in political science. After a brief review of the calculus of finite differences and other estimation techniques, we study stationary ARMA models. In the next section of the course, we examine a number of important topics in time series analysis including "reduced form" methods (granger causality and vector autogression), unit root tests, near-integration, fractional integration, cointegration, and error correction models. Time series regression is also discussed (including pooling cross-sectional and time series data). We learn not only how to construct these models but also how to use them in policy analysis.

We expect students to have a firm grounding in probability and regression analysis and to bring to the course some interesting questions about the dynamics of political processes. The emphasis throughout the course will be on application, rather than on statistical theory. However, the focus of most lectures will be statistical theory. Homework will revolve as much as possible around the time series you are interested in understanding. To that end, students will need to gather time serial data for analysis during the first week of class (this data need not be used throughout the term, though that would make your life easier). The length of the series should be at least 40 time points; longer series are better than shorter ones.

This is the first part of a fourteen-week seminar team-taught by Professors John Freeman, Janet Box-Steffensmeier, and Jon Pevehouse. Students are strongly encouraged to take both parts of the course.

Panel Data Analysis

Instructor: Brian Gaines, University of Illinois Urbana-Champaign
Email: bjgaines@uiuc.edu
Times: 1:30 - 3:30 CST, Wednesdays
Spring II Schedule:
March 10, 31, April 7, 14, 21, 28, May 5

Description:

This course will introduce the very large and rapidly growing statistical literature on analyzing data in which observations are a cross section of some units (e.g. individuals, countries, states, firms) over multiple time periods. I will use "panel data" in a broad sense to mean any data spanning multiple dimensions, usually (but not necessarily) time and space, but our focus will mostly be on cases in which we have much larger Ns than Ts. In general terms, the advantage to having time and space variance is that one can avoid inferring that inter-personal differences across units are equivalent to inter-temporal differences within units. For instance, in a cross-section if we find that age is a significant predictor of voting, we often infer that this result implies a forecast that all members of the relevant population will vote with increasing probability as they age. From a time series on just one unit, we might make the companion inference: that an observed life-cycle change in one unit implies across-age variation in a population that is heterogeneous in age in any given time period. With data that vary on both dimensions, one can better disentangle inter-unit and inter-temporal variance, and thus, in many contexts, adjudicate between rival behavioral theories. The increasing availability of large data sets and powerful computers has made panel models more and more prominent in econometrics.

None of the ITV classes assume any specialized skills or prerequisites beyond familiarity with classic regression and a degree of comfort with matrix calculations. In a perfect world, one might study both maximum likelihood estimation and time series analysis in advance of panel data models, but I will not assume that students have followed that particular sequence.

In seven weeks, we cannot possibly cover even a full introductory text, let alone the whole field, so I must emphasize the first word in the title: this course should be regarded as only a first step. We will work from Cheng Hsiao's Analysis of Panel Data (Cambridge, 2003), with the aim of covering less than half of the book. A few political science applications will be added, and we'll deal with computing issues at least briefly. However, the course will probably, given its brevity, emphasize theory at the expense of practice.

1. Wed 10/03: Introduction, Analysis of Covariance
2. Wed. 31/03: Variable Intercepts, Fixed Effects
3. Wed. 07/04: Variable Intercepts, Random Effects
4. Wed. 14/04: Heteroskedasticity, Serial Correlation
5. Wed. 21/04: Simultaneous Equations
6. Wed. 28/04: Guest Lecture: Douglas Rivers (Stanford)
7. Wed. 05/05: A brief survey of excluded topics: dynamic models, limited dependent variables, unbalanced panels, data fields, multi-level models, etc.

An additional caveat is that this will be the beta-if not alpha-version of this course, i.e. I have not taught it before. I'll determine what the precise evaluands will be later, but I anticipate that there will be a couple of problem sets, and that I'll have students make short presentations in some sessions.

Required text: Hsiao, Cheng. 2003. *Analysis of Panel Data, 2nd.* Cambridge: Cambridge University Press.

Recommended: Baltagi, Badi H. 2001. *Econometric Analysis of Panel Data, 2nd Ed.* Chichester/NY: John Wiley and Sons, Ltd.