This course covers quantitative methods of time series, panel, time-series-cross-section, and event history (duration) data. I have three major goals for the course. First, I hope to cultivate a broad set of tools so that you can be more conversant with your colleagues and better engage the published material across the discipline. The methods covered in this course are used frequently, and your understanding for the cutting edge research will improve as you can better follow the empirical methodology. Second, I hope you will have a firm foundation on which you can further explore the topics that interest you in greater depth. In the limited class periods, I will be unable to cover everything as deeply as you might like, but I hope to at least expose you to the techniques and point you in the right direction for further exploration. Third, I hope that you will be able to use the methods in your own research. If your research questions call for the methods covered in this course, then you should be able to use them with confidence and analytic rigor.

**Structure**
The topics covered will unfold in three parts. First, I will lecture on the assigned topics. The lectures will combine mathematical principles from the readings with general intuition on how it all applies to political science research. Second, we will spend time exploring the course concepts in a laboratory environment. We will primarily use Stata, but I will also teach some of the applications in R. Students are welcome to use either type of software. By the third week of the course, each student should obtain data with 1) a time series of at least 50 observations, 2) a panel/TSCS dataset with N>10 and T>50, and 3) a data set that can be used for duration analysis. The data should be clean and ready to use in class. It is possible that a single dataset could meet all these requirements.

Third, in the class period that follows our coverage of a topic, students will take turns guiding discussion of a paper that has additional applications or extensions. The objectives are to drive home concepts that we already learned, see some additional ways in which the methods are used in practice and consider extensions of the concepts. Each presentation (5-10 minutes) will include a summary of the article and a detailed assessment of how the methods used apply to the course concepts. One fruitful avenue of discussion from these presentations is how we can (and should) use the methods in the discussed paper in applications outside of the paper’s context (i.e., our own research). I expect all students in the class to have read the papers being presented in advance.

**Assignments**
- **Class Participation (10%)**
  Students are expected to come prepared to each class ready to discuss the assigned reading. Students will also lead part of the class once during the semester, as described above.
• **Problem Sets (40%)**

Students will complete weekly assignments during the semester. The assignments will ask the students to demonstrate their mastery of the course material. Each assignment will have some questions related to the mathematical foundations of the course topics, some requiring the methods to be used, and some demanding an intuitive interpretation of the findings. Late problem sets will lose one point (out of ten) per day late, starting at the moment that the assignments are collected.

• **Final Project (50%)**

Students will complete a methods paper on a topic of their choosing, using longitudinal data. The paper should be 15-20 pages (double spaced) of text, plus additional pages with tables, figures, notes and references. The paper can be a replication paper of a major work in the literature, or it can be a paper related to an ongoing research project. No more than 20% of the paper can be copied and pasted from a student’s existing research project. In the paper, each student should present the hypotheses tested and a brief overview of why the hypotheses are both interesting and justified. The bulk of the paper will be on the research design and results, with a brief conclusion to sum up the findings. The objective is to demonstrate mastery of the course concepts, so the students should explore many different facets of the appropriate methods. The write-up should be clear and concise, with all tables and figures formatted neatly. On the third week of class, each student will turn in a one-page proposal of the research project.

As part of the final-project grade, students will present their work at a conference-style gathering on May 9th (time/location TBA). Each student will have 15 minutes to present the research project, and then there will be 10 minutes of question-and-answer time. Professor Beardsley will provide light refreshments.

**Books Needed**


**Schedule**

1/19: Introduction to the Course and Stata primer

1/24 & 1/26: Stationarity, serial correlation, independence

Cromwell et al.: Chs. 1-5

Application and Extension (1/31):

1/31&2/2: Time Series Hypothesis Testing

**Due:** Data sets ready for use during class labs; proposal of the research project.

Cromwell et al.: Chs. 6-9

Brandt and Williams: Ch 1

Application and Extension (2/7):

2/7&2/9: Multiple Time Series Models

Brandt and Williams: Chs. 2 & 3


Application and Extension (2/14):

2/14&2/16: Panel & TSCS Introduction


Application and Extension (2/21):

2/21&2/23: Unit Heterogeneity


Application and Extension (2/28):

2/28&3/1: Dynamic Panel Data

Wilson, Sven E. and Daniel M. Butler. 2007. A lot more to do: The sensitivity of time-series cross-section analyses to simple alternative specifications. Political Analysis 15(2): 101-123.


Application and Extension (3/6):

3/6&3/8: Binary Responses & GEE & Nonrandom Sample/Treatment Selection


Application and Extension (3/20):

3/20&3/22: Spatial Autocorrelation


Application and Extension (3/27):

3/27&3/29: Introduction to Event History Models
Box-Steppensmeier and Jones, Chs. 1-3, 11


Application and Extension (4/10):

4/10&4/12: Event History Model Selection and Specification
Box-Steppensmeier and Jones, Chs. 4-8

Application and Extension (4/17):

4/17&4/19: Frailty, Variance-Corrected Models and Competing Risks
Box-Steppensmeier and Jones, Chs. 9&10


Application and Extension (4/24):

4/24&4/26&5/1 Non-proportional hazards and other extensions


5/9: All day conference-style presentations